
Appendix B

Primary Site Descriptions of the Northern Highland - American Legion State Forest

Appendix B contains site descriptions, site significance, and management considerations for the 65 primary sites and 4 macrosites containing some natural feature that raised their importance over the remaining inventory sites analyzed for this report. Refer to the main body of the report for a more detailed discussion of site selection and definitions (Summary of Results). A listing of the Ecologically Significant Sites Outside the NHAL Boundary is located at the end of the Appendix B. Specific management considerations for individual plant and animal species are provided in Appendices E and F.

Each primary site description is organized in three sections:

Site Description: describes the existing natural features, surrounding land uses, and some of the past management activities.

Site Significance: describes the important natural features and why they are of significance. Significance can include important natural communities or successional stages, rare species, existing land use designations and overall significance at both the local and regional levels.

Management Considerations: describes the management to protect, maintain and enhance the important features of the site. Development of these considerations included:

- identifying those processes or actions needed to maintain the integrity of ecosystems and ecosystem complexes and rare species present.
- identifying potential impacts from natural disturbances, human use, and development pressure.
- highlighting the importance of selecting the most appropriate land use classification or designation for each site via the master planning process. All of the 65 sites represent priority areas that should be given a management classification that would ensure habitat needed for endangered resources and restore and perpetuate native communities. A subset of 36 sites (p. 30) has greater significance than the remaining 29 sites and are identified in this appendix by the statement “should be considered for strong protective designation.” These 36 sites are of comparable significance to existing SNAs, and may represent ecological components that are missing or underrepresented from the existing SNAs.

Within each site description, discrepancies may exist between the rare species mentioned in the site narratives and those listed in the site tables. For example, a site narrative may mention the presence of a rare plant or animal, but the species is not included in the site table. This can occur for the following reasons:

1. Certain rare plants and animals are disturbance sensitive or vulnerable to exploitation and these records were deleted from the table and/or descriptions.
2. Locations of some species, particularly animals, may be generalized in the NHI database and did not always show up within our site survey polygon boundaries. An example includes those species with high mobility (i.e. timber wolf).
3. Specimen identification can be a lengthy process, especially for some of the difficult invertebrates that must be handled by outside experts. A lag time may occur in completely processing these records.

The boundaries for non-DNR owned lands were obtained from a 1998 DNR GIS public lands coverage. The coverage does not represent legal ownership boundaries and may encompass errors in presentation.

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1. CATHERINE LAKE HEMLOCK-HARDWOODS

Ecoregion: Winegar Moraines
USGS 7.5' Quadrangle: Winchester
Town-Range-Section: T43N-R4E-secs. 1, 2, 11, 12
Size: 967 acres

Site Description

Rolling glacial moraine topography is forested with mature stands of mesic hardwoods and hemlock-hardwoods. The dominant trees are sugar maple, hemlock, yellow birch, and basswood. Supercanopy white pine are present in some areas. The older and least disturbed stands exhibit, or are developing, old-growth structural characteristics including large diameter trees, large snags, a multi-layered canopy, coarse woody debris, and pit and mound microtopography. Most, if not all, of the site's upland forests have been selectively logged in the past. In some stands the past cutting was very light, but the reproduction of sugar maple is generally outpacing that of both hemlock and yellow birch at this time.

Associated with the extensive upland forests are five small undeveloped lakes, a complex of wetland communities including open bog, black spruce swamp, emergent marsh, sedge meadow and alder thicket, and several miles of undeveloped lake and stream shoreline. The mesic forests of the Winegar Moraine are similar to but somewhat richer than those found on the much more extensive glacial outwash landform to the south.

Site Significance

This site supports the most significant natural community complex identified to date on state-owned lands in this ecoregion. Older stands of mesic forest are currently rare in northern Wisconsin's present landscape (including on national and county forest lands) and protection of this site would fill an important gap in both the state and federal systems of natural community protection.

Among the rare species documented here are several birds and plants. The state record "big tree" yellow birch is found here. This site should provide secure habitat for all of them if managed and protected appropriately.

Management Considerations

All or a significant portion of this site should be considered for strong protective designation in the forest master plan. The natural communities occurring here are not well represented in protected areas in the Wisconsin portion of this ecoregion. The older successional stages of mesic hardwood forest, in particular, are virtually absent from protected, publicly owned lands anywhere in northern Wisconsin. Continued natural succession would provide for the development and maintenance of old-growth conditions.

The lakes are small (largest is 33 acres), soft, shallow, muck-bottomed, and receive most of their water from groundwater seepage. One of the lakes has hard water. These lakes have apparently not been stocked, chemically treated, or otherwise altered.

CATHERINE LAKE HEMLOCK-HARDWOODS			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
NORTHERN MESIC FOREST		NA	1994
ANIMALS			
BALD EAGLE (HALIAEETUS LEUCOCEPHALUS)	LTNL	SC/FL	1992
BLACK-BACKED WOODPECKER (PICOIDES ARCTICUS)		SC/M	1994
BLACK-THROATED BLUE WARBLER (DENDROICA CAERULESCENS)		SC/M	1994
CAPE MAY WARBLER (DENDROICA TIGRINA)		SC/M	1993
GRAY JAY (PERISOREUS CANADENSIS)		SC/M	1994
SWAINSON'S THRUSH (CATHARUS USTULATUS)		SC/M	1994
PLANTS			
ALGAE-LIKE PONDWEED (POTAMOGETON CONFEROIDES)		THR	1994
GIANT RATTLESNAKE-PLANTAIN (GOODYERA OBLONGIFOLIA)		SC	1996
NORTHERN BLACK CURRANT (RIBES HUDSONIANUM)		SC	1996

M1. LOWER MANITOWISH RIVER MACROSITE

Ecoregion: Northern Highland Pitted Outwash
USGS 7.5' Quadrangle: Winchester, Mercer, Wilson Lake, Powell
Town-Range-Section: T42N-R4E-secs. 1-4, 8-10, 13-24, 26-35
T43N-R4E-secs. 14, 22-23, 25-27, 33-36
Size: 23,151 acres

Survey Sites contained within this macrosite include:

- North Bass Lake Hemlocks and Bog
- Du Page Lake and Pines
- Sugar Lake (Plunkett Lake)
- Manitowish River Wilderness Area
 - Frog Lake and Pines
 - Manitowish River Pines
 - Manitowish-Bear River Wetlands
- Sandy Lake Beach and Bog

Site Description

This large complex of wetlands, lakes, streams, and forests occurs in the northwestern corner of the NHAL. Important natural communities and aquatic features of this area include: mature stands of dry-mesic forest (with white and red pines the dominant canopy species); mesic hemlock-hardwood forests, including several small stands in old-growth, late successional stages; a small stand of late successional white cedar (Manitowish River Cedars); extensive acid peatlands of open bog, muskeg, and black spruce swamp; a variety of undeveloped seepage lakes of low to moderate fertility, and; the lower portions of the Manitowish River, a medium-size slow, warm, hardwater stream that is highly significant to aquatic biota and is flanked by a diverse mosaic of wetland communities including emergent and submergent marshes, northern sedge meadow, shrub swamp, and floodplain forest.

Site Significance

This macrosite contains relatively few developments other than roads and adjoins other public lands to the west, most notably the Turtle-Flambeau Flowage and Boot Lake Wildlife Area. The NHAL's sole designated Wilderness Area (6,358 acres) is within the macrosite perimeter. Other significant conservation lands in the vicinity include the Park Falls District of the Chequamegon National Forest, portions of the Lac du Flambeau Ojibwa Reservation, and the Bass Lake Preserve of The Nature Conservancy (a private conservation organization). Adjacent ecologically significant sites also occur within the state forest on the moraine just to the north, such as "Catherine Lake Hemlock-Hardwoods" (see site description).

The forested areas are integral parts of a large relatively natural landscape. The wetlands and the river itself are of very high significance due to their size, quality, content, context, and linkage to other features downstream. Vast undeveloped peatlands and extensive forests of mature red and white pine are among the Northern Highland's most important and characteristic natural features.

Management Considerations

Opportunities for management at a large scale and across administrative boundaries should be emphasized. The essential ecological integrity and unity of this area should be recognized and maintained. Each site has specific management considerations relevant to their individual circumstances.

To make the description and analysis of this large area more manageable, we have divided it into several of its major components, each of which will be described in the following pages.

LOWER MANITOWISH RIVER MACROSITE			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
4 EMERGENT AQUATIC		NA	1992
2 LAKE--DEEP, VERY SOFT, SEEPAGE		NA	1992
LAKE--SHALLOW, SOFT, DRAINAGE		NA	1989
2 LAKE--SHALLOW, SOFT, SEEPAGE		NA	1992
LAKE--SOFT BOG		NA	1995
LAKE--UNIQUE		NA	1995
3 NORTHERN DRY-MESIC FOREST		NA	1995
2 NORTHERN MESIC FOREST		NA	1994
2 NORTHERN SEDGE MEADOW		NA	1990
NORTHERN WET FOREST		NA	1994
NORTHERN WET-MESIC FOREST		NA	1992
3 OPEN BOG		NA	1994
SHRUB-CARR		NA	1980
SPRING LAKE		NA	1981
STREAM--FAST, HARD, WARM		NA	1999
STREAM--SLOW, HARD, WARM		NA	1999
ANIMALS			
3 BALD EAGLE (HALIAEETUS LEUCOCEPHALUS)	LTNL	SC/FL	1983
EVENING GROSBEAK (COCCOTHRAUSTES VESPERTINUS)		SC/M	1981
GREATER REDHORSE (MOXOSTOMA VALENCIENNESI)		THR	1981
LAKE DARNER (AESHNA EREMITA)		SC/N	1981
9 OSPREY (PANDION HALIAETUS)		THR	1994
PUGNOSE SHINER (NOTROPIS ANOGENUS)		THR	1992
ROUND PIGTOE (PLEUROBEMA SINTOXIA)		SC/H	1994
SPLendid CLUBTAIL (GOMPHURUS LINEATIFRONS)		SC/N	1994
SWAINSON'S THRUSH (CATHARUS USTULATUS)		SC/M	1991
YELLOW-BELLIED FLYCATCHER (EMPIDONAX FLAVIVENTRIS)		SC/M	1997
PLANTS			
ALGAE-LIKE PONDWEED (POTAMOGETON CONFERVOIDES)		THR	1994
COMMON BOG ARROW-GRASS (TRIGLOCHIN MARITIMUM)		SC	1996
FARWELL'S WATER-MILFOIL (MYRIOPHYLLUM FARWELLII)		SC	1994
LARGE ROUNDLEAF ORCHID (PLATANThERA ORBICULATA)		SC	1994
2 MARSH WILLOW-HERB (EPILOBIUM PALUSTRE)		SC	1996
2 NORTHEASTERN BLADDERWORT (UTRICULARIA RESUPINATA)		SC	1996
PALE SEDGE (CAREX PALLESCENS VAR NEOGAEA)		SC	1936
2 PURPLE BLADDERWORT (UTRICULARIA PURPUREA)		SC	1996
2 SWAMP-PINK (ARETHUSA BULBOSA)		SC	1996

2. NORTH BASS LAKE HEMLOCKS AND BOG

(Lower Manitowish River Macrosite)

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Winchester
Town-Range-Section: T43N-R4E-secs. 22, 23, 14
Size: 1,119 acres

Site Description

North Bass Lake, an undeveloped, 180 acre, shallow, soft water seepage lake, is situated within an extensive muskeg of sphagnum mosses, ericaceous shrubs, and stunted black spruce and tamarack. Several other undeveloped seepage lakes occur nearby and within the same basin. The uplands have generally been managed for timber products, but there is an older stand of hemlock-hardwoods to the west of North Bass Lake that retains the compositional and many of the structural features of an old-growth stand. Selective cutting has occurred here recently.

Site Significance

The major communities at this site are in good condition and some ecological linkages with other natural features in the landscape have been retained. Rare plants and animals have been documented here. The wetlands are actually part of a much larger complex that extends south of the county highway all the way to the Manitowish River. See the "Du Page Lake" site description for additional information.

Management Considerations

This site should be considered for strong protective designation, including the lakes, peatlands, and adjoining wetlands that could be degraded by diminished water quality or unnatural water level fluctuations. It should be pointed out that all of the major peatland complexes within the NHAL boundary have been altered in some way, usually by the construction of dikes and ditches and sometimes accompanied by the commercial cultivation of cranberries or wild rice. This site is no exception, though it is somewhat isolated from unnatural disturbances by its location at the northern edge of this large wetland. The wetlands to the south of county highway "J", southeast of South Bass Lake, have been significantly altered by an extensive ditch system.

Commercial logging within the hemlock-hardwood forest appears to have increased sugar maple and decreased the more sensitive and regionally diminished species such as yellow birch and hemlock. This site provides a good opportunity for restoration of old-growth hemlock-hardwood forest.

NORTH BASS LAKE HEMLOCKS AND BOG			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
EMERGENT AQUATIC		NA	1980
LAKE--SHALLOW, SOFT, SEEPAGE		NA	1994
NORTHERN MESIC FOREST		NA	1994
OPEN BOG		NA	1994
ANIMALS			
OSPREY (PANDION HALIAETUS)		THR	1992
PLANTS			
SWAMP PINK (ARETHUSA BULBOSA)		SC	1995

3. DU PAGE LAKE AND PINES

(Lower Manitowish River Macrosite)

Ecoregion:	Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle:	Winchester
Town-Range-Section:	T43N-R4E-secs. 25, 26, 27, 33, 34, 35, 36. T42N-R4E-secs. 1, 2, 3, 4.
Size:	3,936 acres

Site Description

Du Page Lake is situated within a vast peatland complex of several thousand acres north of the Manitowish River. While the predominant vegetation is open bog, muskeg, and black spruce swamp, there are scattered small patches of old-growth hemlock-hardwood forest, "islands" of old-growth pine, and at least eight undeveloped lakes.

Thirty-two acre Du Page Lake is deep, with very soft water, and has a bottom of muck and sand with patches of gravel. Several stands of old-growth hemlock-hardwood forest occur on the east side of the lake, and are especially noteworthy as they contain a "supercanopy" of very large white and red pine. The wetlands are generally boggy, with a deep carpet of sphagnum mosses supporting ericaceous shrubs including cranberry, bog laurel, leatherleaf, sedges, and insectivorous plants. Stunted black spruce and tamarack are scattered throughout the wetland, in a few places forming a closed bog forest composed of denser growths of larger spruce.

Site Significance

Old-growth forest is rare throughout Wisconsin, and the remnants here, though small, are important examples of this forest successional stage. The peatlands are, for the most part, in excellent condition, excepting the area southeast of South Bass Lake which has been developed for "wild rice" culture. Rare plants and animals were documented in all of the primary natural communities surveyed, and in the lake itself.

Management Considerations

This site harbors valuable natural features and should be considered for strong protective designation. In the past, a portion of this site had been proposed for "Scientific Area" designation (the forerunner of the present State Natural Area program). Establishing an appropriate buffer around the existing old-growth forest and prohibiting commercial timber harvest at the site and buffer would help protect the important ecological features of this site.

Du Page Lake is a small oligotrophic lake, which is potentially very sensitive to adverse water quality impacts. The needs of nesting birds, such as common loon and osprey, and rare aquatic plant species should be considered when weighing the acceptability of management activities and various uses.

Most lakes in Wisconsin are experiencing heavy development. The ecological components of this site cannot absorb heavy or even moderate use by large powerboats or personal watercraft. Maintaining the undeveloped character of the lakes in this area by limiting motorized access would provide an opportunity to protect a natural lake and adjoining wetland community. Monitoring of the types and levels of uses here should be a priority, and if specific problems are identified, appropriate steps taken to reduce or eliminate them.

DU PAGE LAKE AND PINES			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
LAKE--DEEP, VERY SOFT, SEEPAGE		NA	1992
LAKE--SHALLOW, SOFT, SEEPAGE		NA	1981
NORTHERN MESIC FOREST		NA	1992
OPEN BOG		NA	1996
ANIMALS			
OSPREY (PANDION HALIAETUS)		THR	1992
PLANTS			
ALGAE-LIKE PONDWEED (POTAMOGETON CONFERVOIDES)		THR	1983
COMMON BOG ARROW-GRASS (TRIGLOCHIN MARITIMUM)		SC	1936
LARGE ROUNDEAF ORCHID (PLATANThERA ORBICULATA)		SC	1996
MARSH WILLOW-HERB (EPILOBIUM PALUSTRE)		SC	1996
SWAMP PINK (ARETHUSA BULBOSA)		SC	1996

4. SUGAR LAKE (PLUNKETT LAKE)

(Lower Manitowish River Macrosite)

Ecoregion: Northern Highland Pitted Outwash
USGS 7.5' Quadrangle: Winchester
Town-Range-Section: T42N-R4E-secs. 3, 10.
Size: 52 acres

Site Description

This waterbody is a 48 acre spring lake and moderately fertile with light brown water. The lake has a maximum depth of 35 feet and a bottom composed of rubble, sand, gravel, and muck. The poorly defined outlet drains southwestward to the Manitowish River. Aquatic vegetation is generally sparse. White and yellow water lilies, pondweeds, and water horsetail are among the plant species present. Freshwater sponges are common in this lake.

The uplands are forested with nondescript stands of northern hardwoods. Paper birch, red maple, and trembling aspen are the primary canopy species. Some white pine and hemlock exist on the north and west shores of the lake.

Busy US highway 51 is located less than a quarter mile to the south of the lake. An improved access road and boat landing facilitate additional recreational uses.

Site Significance

This is an uncommon lake type with an undeveloped shoreline in public ownership.

Management Considerations

This site should be considered for strong protective designation because of the rare aquatic communities. Increases in recreational use due to the proximity to US highway 51 and the improvement of the access road could degrade the important aquatic communities that exist here.

SUGAR LAKE (PLUNKETT LAKE)			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
EMERGENT AQUATIC		NA	1981
SPRING LAKE		NA	1995

5. MANITOWISH RIVER WILDERNESS AREA

(Lower Manitowish River Macrosite)

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Mercer, Wilson Lake, Powell
Town-Range-Section: T42N-R4E-portions of secs. 7-9, 16-21, 27-33.
Size: 6,324 acres

Three previously separate survey sites (Frog Lake and Pines State Natural Area, Manitowish River Pines, and Manitowish-Flambeau-Bear River Wetlands) were combined here to emphasize the intact mosaic of natural community patches contained within the Wilderness Area:

Site Description

The Wilderness Area contains a diverse mosaic of natural communities and aquatic features. Among the most important of these are: scattered stands of old-growth to mature dry-mesic forest dominated by large to medium-size (9-15" d.b.h., 15"+ d.b.h.) red and white pines (some of these stands occur on small upland "islands" surrounded by wetlands); a five mile, undeveloped stretch of the lower Manitowish River; a slow, warm, medium-size hardwater stream; an undeveloped, deep, softwater seepage lake with a diverse aquatic flora; and extensive undisturbed peatlands of open bog/muskeg, northern sedge meadow, and black spruce swamp.

Other communities are also represented at a variety of scales but generally are of good quality. The communities include alder thicket, shrub-carr, northern wet-mesic forest (white cedar swamp) and, in small patches along the Manitowish, the regionally rare floodplain forest. Beds of emergent, submergent, and floating-leaved aquatic macrophytes exist at many locations along the river.

Away from the influence of the relatively nutrient-rich river water, the wetlands are boggier, with a sphagnum moss substrate supporting sedges, ericaceous shrubs, insectivorous plants, scattered, often stunted, black spruce and tamarack, and, rarely, closed black spruce forests.

Additional aquatic features of note are a one mile stretch of the Bear River and a two mile stretch of the upper Flambeau River.

Red pine plantations and second-growth forest composed of pole-size hardwoods such as paper birch, trembling aspen, and red maple, also occur on uplands within the Wilderness Area.

Site Significance

Intact stands of older pine forest are rare in this landscape and throughout the remainder of Wisconsin. This site, and nearby areas where pines remain the dominant forest tree species, could serve as the nucleus of one of the major dry-mesic to dry conifer forest conservation and restoration areas in northern Wisconsin.

Rare aquatic plants and animals occur in the lake and in the Manitowish River. The wetlands and older pine forests also support rare species. An excellent representation of the biota characteristic of the communities of the Northern Highlands Pitted Outwash ecoregion is present. A key consideration for this site, beyond the high quality and diverse interactive mosaic of natural communities and aquatic features present, is its size and linkage to other sites.

Management Considerations

The Manitowish River Wilderness Area contains some of the best examples of the natural features representative of this ecoregion. Though this site is currently designated “Wilderness,” it is nevertheless important to develop a site management plan that will effectively address the long-term maintenance of the natural communities, aquatic systems, and sensitive biota occurring there. Barring the intervention of a natural disturbance such as wildfire, successional processes may eventually result in a radical shift in dominant plant species. Natural disturbances may not occur at a scale or frequency adequate to maintain or aid in the restoration of the pine-dominated (or other) ecosystems, even though this site is considered “large”.

In this case, pine appears to be succeeding to hardwoods. Development of a plan appropriate to the type of features present and the site’s land use classification (i.e. Wilderness Area, State Natural Area) should be a priority. There is great opportunity to conduct applied research in a wilderness and State Natural Area context due to the presence, on and near the site, of: undisturbed old-growth and mature forest patches; younger, recently managed pine forest; more disturbed, second-growth stands of pole hardwoods (on sites that formerly supported pine forests); and pine plantations. Such research should result in needed solutions to the management issues identified here. The findings of the research could also be useful for the same or similar issues at other sites on and around the NHAL, particularly where restoration is being considered.

Protection and management of pine forests in a variety of block sizes and in all successional stages is one of the highest priorities for both this ecoregion and property. Small stand size imposes conservation limitations on the older pine stands within the site. But, the opportunity for significant expansion of the older stands, both within and beyond the site boundaries, is feasible and is an important management consideration.

The river, lake, and wetlands all ranked very highly in our evaluations. No immediate threats were identified, but periodic monitoring for the presence of troublesome invasive species should be a consideration here.

There are major opportunities to create and maintain ecological connections beyond the site boundaries. The Turtle-Flambeau Flowage, Boot Lake State Wild life Area, The Nature Conservancy's Bass Lake Preserve, and the Park Falls District of the Chequamegon-Nicolet National Forest all contain highly significant natural features, and are located just to the southwest of the Manitowish Wilderness. Extensive peatlands of good quality, several undeveloped lakes, and pockets of relatively undisturbed white pine-red pine and hemlock-hardwoods forest (some of them old-growth) occur to the east and north.

In 1992, the Natural Areas program of WDNR’s Bureau of Endangered Resources conducted baseline vegetation sampling in the pine forest community at Frog Lake. These data should prove useful for future monitoring projects on the NHAL. Extending such a program to include additional forest stands and aquatic features and wetlands should receive due consideration by the planning team.

MANITOWISH RIVER WILDERNESS AREA			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
EMERGENT AQUATIC		NA	1983
LAKE--DEEP, VERY SOFT, SEEPAGE		NA	1991
NORTHERN DRY-MESIC FOREST		NA	1991
NORTHERN SEDGE MEADOW		NA	1991
STREAM--FAST, HARD, WARM		NA	1991
ANIMALS			
BALD EAGLE (HALIAEETUS LEUCOCEPHALUS)	LTNL	SC/FL	1995
LAKE DARNER (AESHNA EREMITA)		SC/N	1991
SWAINSON'S THRUSH (CATHARUS USTULATUS)		SC/M	1991
YELLOW-BELLIED FLYCATCHER (EMPIDONAX FLAVIVENTRIS)		SC/M	1991
PLANTS			
FARWELL'S WATER-MILFOIL (MYRIOPHYLLUM FARWELLII)		SC	1994
NORTHEASTERN BLADDERWORT (UTRICULARIA RESUPINATA)		SC	1994
PURPLE BLADDERWORT (UTRICULARIA PURPUREA)		SC	1994
SWAMP PINK (ARETHUSA BULBOSA)		SC	1995

6. SANDY BEACH LAKE AND BOG

(Lower Manitowish River Macrosite)

Ecoregion:	Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle:	Powell, Winchester, Wilson Lake
Town-Range-Section:	T42N-R4E-portions of secs. 13-16, 21-24, 26-28
Size:	3,088 acres

Site Description

This site features a large acreage of the vast peatlands found within the lower drainage of the Manitowish River. The wetlands are peaty, acidic, and mostly of the muskeg, open bog, and black spruce swamp communities. The resident birdlife includes palm warbler, Lincoln's sparrow, purple finch, and northern harrier. There are also more minerotrophic wetland types present, including shrub swamp (both alder thicket and willow/dogwood swamp) and sedge meadow, most frequently occurring in the vicinity of streams draining the site, such as Lost Creek and Little Bear Creek.

The 112 acre seepage lake has a maximum depth of 7 feet, a mostly sandy bottom, and circumneutral water. There is a non-navigable outlet that flows to Bear Creek. Aquatic vegetation is moderately dense and composed of native species such as pond lilies, pondweeds, water lobelia, and bulrushes. The rare purple bladderwort, a carnivorous species, also occurs here.

Site Significance

These wetlands are highly significant because of their size, quality, lack of development, and association with other valuable natural features.

Although relatively few rare species were documented here during our brief surveys, the wetlands provide breeding areas for habitat specialists as well as for some area sensitive species. Sandy Beach Lake supports several rare aquatic plant species and it is possible that these might be sensitive to water quality changes as well as mechanical disturbance as they are not widely distributed in Wisconsin lakes.

Management Considerations

This site should be considered for strong protective designation. Peatlands are of particular importance, with priorities extended to stands that are large, functionally intact, support significant diversity, and are ecologically connected to other important natural features. The primary management need for the wetlands of this site is to protect and monitor hydrologic function, especially any actions that might disrupt drainage patterns, alter ground or surface water chemistry, or fragment the natural community mosaic. An abandoned railroad grade and a gated dike road cross the wetland and should be investigated further to determine the affect on hydrology.

Sandy Beach Lake has several developments, including a small campground, boat landing, and picnic area. Impacts should be minimized to avoid negative water quality impacts, disturbance to the aquatic macrophyte beds, or the inadvertent introduction of invasive species.

SANDY BEACH LAKE AND BOG			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
EMERGENT AQUATIC		NA	1981
LAKE--SHALLOW, SOFT, DRAINAGE		NA	1994
OPEN BOG		NA	1994
SHRUB-CARR		NA	1981
ANIMALS			
EVENING GROSBEAK (COCCOTHAUSTES VESPERTINUS)		SC/M	1994
OSPREY (PANDION HALIAETUS)		THR	1992
PLANTS			
MARSH WILLOW-HERB (EPILOBIUM PALUSTRE)		SC	1996
NORTHEASTERN BLADDERWORT (UTRICULARIA RESUPINATA)		SC	1996
PURPLE BLADDERWORT (UTRICULARIA PURPUREA)		SC	1996

7. SHERMAN LAKE

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Powell
Town-Range-Section: T42N-R4E-sec. 36
T42N-R5E-sec. 31
Size: 400 acres

Site Description

This 123 acre deep, softwater, seepage lake is situated in sandy outwash at the edge of Powell Marsh, a large acid peatland. The lake bottom is composed mostly of sand. Aquatic vegetation is generally sparse, though beds of emergents occur in narrow bands along and parallel to the shoreline. Representative species include pickerel weed, yellow pond lily, bulrushes, spikerushes, and water horsetail. "Sterile rosette" species such as pipewort and water lobelia are also present. There are no developments on this lake.

The lake is bordered by a large, ditched muskeg to the east and south. Uplands to the north and west support second-growth stands of rather nondescript mesic to dry-mesic forest, composed of paper birch, red maple, and bigtooth aspen. Several small stands of swamp conifers are also present.

Site Significance

Sherman Lake is immediately adjacent to and partially within Powell Marsh State Wildlife Area. The lake and its immediate surroundings are undeveloped. Several rare plants and animals are resident in or near the lake.

Management Considerations

The protection level for this site should remain high, focusing on hydrology, water quality, and aquatic life. Currently, the aquatic community is in very good condition and sensitive species are present. This lake could be considered for "benchmark" status, as it offers a good opportunity to maintain a high quality aquatic community unimpacted by development.

SHERMAN LAKE			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
EMERGENT AQUATIC		NA	1994
LAKE--DEEP, SOFT, SEEPAGE		NA	1994
OPEN BOG		NA	1994
ANIMALS			
YELLOW-BELLIED FLYCATCHER (EMPIDONAX FLAVIVENTRIS)		SC/M	1994

8. TOY LAKE CEDAR AND ASH SWAMP

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Winchester
Town-Range-Section: T43N-R5E-secs. 19, 20, 29-33
T43N-R4E-secs. 25, 36
Size: 3,473 acres

Site Description

This large wetland complex of hardwood swamp, white cedar swamp, and alder thicket surrounds a basin containing a shallow, drained lake with dense emergent aquatic and wet meadow vegetation. Within this wetland site are scattered upland "islands" or ridges that support stands of mature hemlock-hardwoods. Some of the islands feature numerous large-diameter white spruce and an occasional supercanopy white pine.

The hardwood swamp community is dominated by black ash, with yellow birch, red maple, and an occasional conifer (usually balsam fir or white cedar) among the typical associates. A wide array of size and age classes is present, and ash is reproducing well in all of them.

The white cedar-dominated conifer swamps are generally mature, floristically diverse, and extensive, especially to the north and east of Toy Lake. Several small streamlets were noted within the cedar swamp, apparently arising from springs or seepages and draining toward Toy Lake.

Site Significance

Both white cedar and ash swamps are uncommon in this ecoregion, and are especially so at a large scale (hundreds to thousands of acres). The community mosaic here affords a rare opportunity to maintain extensive, relatively intact examples of representative northern Wisconsin communities and their associated biota. Because fragmentation is relatively low in the local landscape, it should also be possible to protect the ecological processes, species interactions, and environmental gradients important in north woods ecosystems. Very few sites in northcentral Wisconsin protect cedar or ash swamps at any scale. Black ash swamps, in particular, are very poorly represented in special management areas.

Many uncommon species were recorded here, with boreal birds being especially well represented.

Management Considerations

Toy Lake Cedar and Ash Swamp should be considered for strong protective designation because of the large size of the site, the large stand size of the major communities, the overall good quality and condition of all communities represented, and the high number of rare and uncommon species.

Portions of the site are privately owned. Browse pressure on white cedar is high and the feeding of deer locally may be exacerbating the situation. Beaver have created several small impoundments, drowning patches of alder and ash. Future construction of roads, snowmobile trails and other corridors across this site may impact site hydrology and increase fragmentation.

TOY LAKE CEDAR AND ASH SWAMP			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
BOREAL FOREST		NA	1993
HARDWOOD SWAMP		NA	1993
NORTHERN WET-MESIC FOREST		NA	1993
ANIMALS			
BALD EAGLE (HALIAEETUS LEUCOCEPHALUS)	LTNL	SC/FL	1992
BIRD ROOKERY		SC	1993
BLACK-BACKED WOODPECKER (PICOIDES ARCTICUS)		SC/M	1993
BOG FRITILLARY (BOLORIA EUNOMIA)		SC/N	1993
BOREAL CHICKADEE (POECILE HUDSONICUS)		SC/M	1993
CAPE MAY WARBLER (DENDROICA TIGRINA)		SC/M	1993
FRIGGA FRITILLARY (BOLORIA FRIGGA)		SC/N	1993
GRAY JAY (PERISOREUS CANADENSIS)		SC/M	1993
OSPREY (PANDION HALIAETUS)		THR	1992
SPRUCE GROUSE (FALCIPENNIS CANADENSIS)		THR	1993
YELLOW-BELLIED FLYCATCHER (EMPIDONAX FLAVIVENTRIS)		SC/M	1996
PLANTS			
CHILEAN SWEET CICELY (OSMORHIZA CHILENSIS)		SC	1993
NORTHERN BLACK CURRANT (RIBES HUDSONIANUM)		SC	1993
NORTHERN BOG SEDGE (CAREX GYNOCRATES)		SC	1993
VARIEGATED HORSETAIL (EQUISETUM VARIEGATUM)		SC	1993

9. PAPOOSE CREEK PINES

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Papoose Lake
Town-Range-Section: T42N-R5E-secs. 2, 3
Size: 695 acres

Site Description

The nearly level outwash sands bordering Papoose Creek support an extensive conifer forest dominated by pines. The more mature stands surveyed were composed of varying mixtures of medium size/age red pine and white pine, with jack pine present and locally important. Associates include red oak, red maple, and paper birch. Near Papoose Creek, some of the stands contain a boreal component including white spruce and balsam fir.

The land use history of this site includes past fire and logging. Red pine plantations are now scattered throughout this site. Some semi-open, barrens-like stands occur on the north side of the creek and are the likely result of past agriculture attempts (pers.comm., Ralph Hewitt, 1996).

Site Significance

The NHAL presently occupies what had been the heart of one of Wisconsin's greatest pineries. Now the natural pine stands are scattered, generally composed of medium age or younger trees, and large acreages have been converted to plantation monocultures or aspen cover types. The Papoose Creek site has retained dominance by native conifers, a key landscape consideration at the community level and critical for certain uncommon or restricted wildlife species (evening grosbeak, pine siskin, red crossbill, and others were all noted here during their breeding seasons) that now have a patchy distribution across the northern Wisconsin landscape.

Management Considerations

This site could be considered as a nucleus for expanded pinery management via a combination of protection, stand conversion (deciduous species to conifers, conifer plantations to more natural and diverse pine or pine-oak forests), extended rotations, and other forms of active and passive management. Maintaining the existing conifer cover, and expanding where feasible and deemed appropriate, should be a priority consideration. A substantial portion of the state-owned forested land to the south is also pine-dominated and should also be considered when evaluating management options for this site.

Further investigation of the openings north of Papoose Creek is recommended.

PAPOOSE CREEK PINES			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
NORTHERN DRY-MESIC FOREST		NA	1992
ANIMALS			
BULLFROG (RANA CATESBEIANA)		SC/H	1996

10. RICE CREEK COMPLEX

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Presque Isle, Papoose Lake
Town-Range-Section: T43N-R6E-secs. 27, 28, 33, 34
Size: 1,445 acres

Site Description

This site features a two-mile stretch of Rice Creek, embedded within a large, diverse, conifer swamp of white cedar, balsam fir, black spruce, and tamarack. Several stands of old-growth hemlock-hardwoods are present, each retaining a supercanopy of huge white pine (> 25" d.b.h.). Other significant attributes of this site include open bog and muskeg, a small stand of older, upland white cedar, several undeveloped, softwater seepage lakes, and two small northern fens of exceptionally high floristic diversity.

The stream supports lush, extensive beds of both emergent and submergent aquatic vegetation. The lakes have not been surveyed in detail but are undeveloped, and have no known history of manipulation.

Site Significance

The Rice Creek Complex contains excellent stands of both common and rare natural communities and aquatic features, supports a high concentration of rare plants and animals, and is large enough to maintain most, if not all, of the ecological processes and functions necessary for long-term maintenance.

The significance of this site within the forest and the surrounding region is extremely high.

Management Considerations

This site should be considered for strong protective designation for the ecological values stated above and should receive an appropriate management designation. No actions are needed to maintain the natural communities present, but browse pressure (deer and hare) is high and should be monitored. There are some contextual challenges, as much of the upland acreage around the site has been managed for aspen regeneration. Alternative management options should be identified and considered for the adjoining aspen-birch stands.

Beaver activity on Rice Creek should be monitored. Excessive damming by beavers has caused the inundation and loss of some swamp conifers. On the other hand, the dams provide needed protection to the fragile aquatic beds and from the use of powerboats and personal watercraft on the creek.

RICE CREEK COMPLEX			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
BOREAL RICH FEN		NA	1995
EMERGENT AQUATIC		NA	1992
LAKE--DEEP, SOFT, SEEPAGE		NA	1997
NORTHERN MESIC FOREST		NA	1997
NORTHERN WET-MESIC FOREST		NA	1994

RICE CREEK COMPLEX			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
ANIMALS			
BOG COPPER (LYCAENA EPIXANTHE)		SC/N	1995
BULLFROG (RANA CATESBEIANA)		SC/H	1996
GRAY JAY (PERISOREUS CANADENSIS)		SC/M	1995
YELLOW-BELLIED FLYCATCHER (EMPIDONAX FLAVIVENTRIS)		SC/M	1995
PLANTS			
COMMON BOG ARROW-GRASS (TRIGLOCHIN MARITIMUM)		SC	1995
DOWNY WILLOW-HERB (EPILOBIUM STRICTUM)		SC	1995
LEAFY WHITE ORCHIS (PLATANATHERA DILATATA)		SC	1995
PURPLE CLEMATIS (CLEMATIS OCCIDENTALIS)		SC	1994
SHOWY LADY'S-SLIPPER (CYPRIPEDIUM REGINAE)		SC	1995
SWAMP PINK (ARETHUSA BULBOSA)		SC	1995

11. HIGHWAY 51 MEADOW AND POND

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Manitowish Lake
Town-Range-Section: T42N-R6E-secs. 29, 32
Size: 53 acres

Site Description

A small glacial kettle hole in the level outwash sands along US Highway 51 contains an acid, peaty meadow surrounding a small seepage pond. The surrounding uplands support a managed xeric forest of jack pine, red pine, and aspen.

Site Significance

The wetland and aquatic communities appear to be in good condition and the pond contains a very large population of a rare plant. Peatlands, large or small, are not adequately protected within or around the NHAL.

Management Considerations

The primary management consideration is to protect aspects of site hydrology, especially water quality and water levels. Proximity of a heavily traveled highway could make this problematic over the long-term. Logging activities and road maintenance should be especially sensitive to the important resources of this site.

HIGHWAY 51 MEADOW AND POND			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
POOR FEN		NA	1994
PLANTS			
HIDDEN-FRUITED BLADDERWORT (UTRICULARIA GEMINISCAPA)		SC	1994

12. MANITOWISH RIVER

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Quadrangle: Manitowish Lake, Boulder Junction
Town-Range-Section: T42N-R6E-secs. 20-24, 26-29
Size: 390 acres

Site Description

This portion of the Manitowish River begins at the outlet of Boulder Lake and ends at the inlet to Island Lake. The river averages 55 feet in width, has a maximum depth of 4 feet, and is of medium fertility. Flow velocity ranges from slow to moderate and sand and gravel are the primary bottom materials.

The river is bordered by various types of wetlands and second-growth dry-mesic forest. The river flows southwest, eventually joining the Bear River in Iron County to form the Flambeau River. There are several dams on the Manitowish, including a dam with a 10 feet head at the outlet of Boulder Lake which alters the river's natural flow regime.

Site Significance

The diversity of aquatic insects, fish, and mussels is high and several rare species were documented. The intact watershed and the stream's connection to other important aquatic features and wetland communities downstream make this section of the Manitowish River significant to the forest and the region.

Management Considerations

This site should be considered for strong protective designation because of the rare species and important aquatic features. Dam management should be reviewed to ensure that operation minimizes negative impacts to the aquatic ecosystem.

MANITOWISH RIVER			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
ANIMALS			
GREEN-FACED CLUBTAIL (GOMPHUS VIRIDIFRONS)		SC/N	1997
ROUND PIGTOE (PLEUROBEMA SINTOXIA)		SC/H	1997
SKILLET CLUBTAIL (GOMPHURUS VENTRICOSUS)		SC/N	1997
ZEBRA CLUBTAIL (STYLURUS SCUDDERI)		SC/N	1994

13. DAY LAKE

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Boulder Junction
Town-Range-Section: T41N-R6E-secs. 1, 2
Size: 117 acres (lake only); 235 acres (total)

Site Description

A glacial kettle depression contains a 117-acre seepage lake with exceptionally soft, clear water. The lake is situated in pitted sandy outwash, with surrounding landforms that appear to be drumlins. An unusual, specialized aquatic flora composed mostly of species from the "sterile rosette" group is present. At least one of the species dwelling in the lake is rare. The surrounding uplands (there are essentially no adjoining wetlands) are intensively managed for aspen regeneration, though a 400 feet no-cut zone has been established around the lake for aesthetic purposes. Past management of Day Lake includes chemical treatment at least once in the past.

Site Significance

Day lake is designated as both "State Natural Area" and "Wild Lake" in the existing property master plan. This waterbody is a very good example of a deep, very soft seepage lake and has very limited developments around it. The lake type is best represented in the Northern Highlands Outwash ecoregion and thus offers the best opportunities for conservation and protection.

Management Considerations

This site should be considered for strong protective designation, and thus existing designations should not be changed. Surrounding land uses should be reviewed to determine the impacts on the important natural resources at this site. The no-cut zone should also be reviewed for benefits to water quality. The prominence of surrounding uplands highlights the need to consider protection of the lake's water quality in all upland designations and actions.

"Airshed" concerns could at some point become critical here, as lakes of this type are highly vulnerable to acidification owing to their poor natural buffering. Chemical treatment and other management that alters the aquatic community should be carefully reviewed for impact.

DAY LAKE			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
LAKE--DEEP, VERY SOFT, SEEPAGE		NA	1995
ANIMALS			
BULLFROG (RANA CATESBEIANA)		SC/H	1989
CYRANO DARNER (NASIAESCHNA PENTACANTHA)		SC/N	1994
PLANTS			
AMERICAN SHORE-GRASS (LITTORELLA AMERICANA)		SC	1995

14. NORTH CREEK - TROUT SPRINGS

Ecoregion: Northern Highland Pitted Outwash
USGS 7.5' Quadrangle: Boulder Junction
Town-Range-Section: T42N-R7E-secs. 30 NE1/4; N2SE1/4; E1/2SW1/4
29 SW1/4NW1/4; NW1/4SW1/4
Size: 357 acres

Site Description

The natural features at this site consist of a complex of springs and spring ponds, and associated wetlands of open sedge meadow, marsh, and shrub swamp. The pond outlets converge to form North Creek, which drains southward to Trout Lake. Although this site has a history of trout management, the stream borders have remained in natural vegetative cover.

Site Significance

The open wetlands support at least two rare plant species, both of "Special Concern" in Wisconsin.

Management Considerations

Management should continue to recognize the overall ecological value of the site. Maintaining the stream borders in natural vegetative cover will aid in protecting the existing natural communities and rare plant species.

NORTH CREEK - TROUT SPRINGS			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
NORTHERN WET FOREST		NA	1981
SPRING POND		NA	1993
SPRINGS AND SPRING RUNS, HARD		NA	1993
STREAM--SLOW, SOFT, COLD		NA	1993
PLANTS			
ROBBINS SPIKERUSH (ELEOCHARIS ROBBINSII)		SC	1993
SHEATHED SEDGE (CAREX VAGINATA)		SC	1993

15. GRASSY LAKE

Ecoregion: Northern Highland Pitted Outwash
USGS 7.5' Quadrangle: Tenderfoot Lake
Town-Range-Section: T42N-R7E-sec. 3
Size: 388 acres

Site Description

This 220 acre, infertile, spring-fed drainage lake has a maximum depth of 4 feet. Muck is the primary bottom material, with sand present in some areas. Submergent, floating-leaved plants and emergent aquatic plants are abundant in portions of the lake basin. Representative species include white water lily, water shield, pickerel weed, waterweed, and pondweeds (*Potamogeton* spp.). The lake receives water via overland flow, groundwater seepage, and from a small stream that drains a spring pond to the northwest. “Winterkill” conditions can occur here because of the lake’s shallow depth and the limited inflow of oxygenated water.

The lake is bordered on three sides by a diverse mosaic of wetland communities, including sedge meadow, shrub-carr, alder thicket, muskeg, and black spruce-tamarack swamp. Among the common shoreline plants are sweet gale, marsh cinquefoil, marsh fern, blue flag iris, broadleaf cattail, water horehound, Canada bluejoint grass, swamp milkweed, and sedges (*Carex* spp.). Shrubby areas are composed mostly of speckled alder, bog birch, meadowsweet, and leatherleaf.

The adjacent uplands are forested with second-growth stands of white and red pine, red oak, paper birch, and aspens.

Though lakeside development is limited, a town road runs very close to the east shore and there is a single house on privately-owned land west of the lake. A small parking area to the east of the lake provides access for users.

Site Significance

“Softwater drainage lake” is a rare lake type in the classification presently used by the NHI. Grassy Lake is significant because of its large size, extensive adjoining wetlands, and minimal developments.

At least one rare animal resides at this site.

Management Considerations

Management activities should emphasize water quality protection as a priority. Maintaining the existing aquatic communities would have positive ecological benefits to the existing rare plants and animals.

The Vilas County Surface Water Resources publication (1963) mentions an “aquatic weed problem” at this lake. No evidence of such a problem was noted during our 1994 survey or by earlier researchers in 1980. Additional information on the management history of Grassy Lake is needed. The current aquatic flora is composed of native species characteristic of this lake type in northcentral Wisconsin and the beds of aquatic vegetation provide important habitat for many birds, herptiles, and aquatic invertebrates.

GRASSY LAKE			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
LAKE--SHALLOW, SOFT, DRAINAGE		NA	1994
NORTHERN SEDGE MEADOW		NA	1994
NORTHERN WET FOREST		NA	1994
ANIMALS			
BALD EAGLE (HALIAEETUS LEUCOCEPHALUS)	LTNL	SC/FL	1983

16. HIGH LAKE SPRUCE-BALSAM STATE NATURAL AREA

Ecoregion: Winegar Moraines
USGS 7.5' Quadrangle: Tenderfoot Lake
Town-Range-Section: T43N-R7E-sec. 35, NE 1/4 NE 1/4
Size: 49 acres

Site Description

This site was established as a "State Scientific Area" (now State Natural Area) in the early 1950s to represent the boreal forest (spruce-fir) community. An infestation of spruce budworm in the 1980s eliminated virtually all of the white spruce, and the forest now resembles other second-growth dry-mesic to mesic forests in the area. Previous disturbances have included logging, windthrow, and severe fire.

Site Significance

The existing forest can no longer be viewed as representative of the boreal forest community. However, the site's primary values include its strategic location at the very northern edge of the NHAL and its contribution to a continuous forest cover between the Forest and surrounding properties. Ecologically significant sites in the vicinity include privately-owned lands to the north and, beyond that, the Ottawa National Forest.

Management Considerations

No active management is necessary here at this time and the current designation should be maintained. If better examples of the boreal forest type are located in the future, they should be considered for strong protective designation. This forest could serve as a potential baseline at which to document the behavior of boreal species that reach their southern range limits in this ecoregion. At present it appears that the dominance of boreal species occurs chiefly in transitional or successional stages.

There are several important contextual issues which extend far beyond the perimeter of this rather isolated 40 acre site. The first involves the management of lands surrounding a site within an existing special management designation. The second involves the protection of continuous forest canopy across administrative boundaries. Broader consideration of the conservation opportunities available both within and beyond the boundaries of the State Natural Area or the State Forest would be a useful component of future management plans for this area. Working with other conservation organizations and private landowners to achieve management beyond individual properties is an important goal.

There is a substantial acreage of recently thinned, natural pine forest to the south and west. These stands were not surveyed because of the disturbance to the natural systems caused by the recent thinning and the priorities of the inventory. However, this area does provide important opportunities for long-term restoration of an extensive conifer forest, including an old-growth component.

HIGH LAKE SPRUCE-BALSAM FOREST			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
NORTHERN DRY-MESIC FOREST		NA	1994

17. GARLAND CREEK HEMLOCKS

Ecoregion: Northern Highlands Pitted Outwash.
USGS 7.5' Quadrangle: Thousand Island Lake
Town-Range-Section: T43N-R8E-sec. 34 SE1/4SW1/4
Size: 43 acres

Site Description

This site features rolling topography and contains three small disjunct stands of older hemlock forest within a matrix of intensively managed younger aspen, paper birch and sugar maple stands. The hemlock remnants have a history of management via selective logging.

Site Significance

The northern mesic community type and the late successional stage that exist at this site are not well represented in the local landscape.

Management Considerations

The hemlock stands are very open and park-like. Hemlock reproduction is virtually non-existent. Although this site does not contain large patches of high quality hemlock forest, this cover type was formerly much more widespread in this region and existing remnants should be maintained. Reducing the separation and isolation of the disjunct hemlock forest patches should be a consideration when making management decisions.

GARLAND CREEK HEMLOCKS			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
NORTHERN MESIC FOREST		NA	1992

M2. NORTHEAST SPRINGS-JOHNSON CREEK MACROSITE

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Star Lake, Thousand Island Lake
Town-Range-Section: T42N-R8E
Size: 3,376 acres

Survey Sites contained within this macrosite include:

- Johnson Lake and Barrens
- Johnson Creek and Pines

Site Description

This macrosite is located in the northeastern corner of the NHAL and contains an unusual concentration of softwater springs, spring-fed headwaters streams, and associated wetland communities. A series of at least four distinct soft water spring complexes occurs near the interface of the Winegar Moraine and Northern Highland Pitted Outwash ecoregions. The four complexes – Garland, Goodyear, Salsich, and Siphon Springs – each feature one to several spring ponds. Their outlet streams flow in a generally westerly direction for one to three miles before joining Johnson Creek, which in turn joins other small streams.

Fisheries management has focused on the trout fishery. Salsich Creek has been stocked twice. The rolling sands of the surrounding uplands are forested but are generally managed intensively for aspen, plantation-grown red pine, and jack pine.

Site Significance

One of the two ponds at Goodyear Springs had been previously designated as a State Natural Area. The concentration of soft water spring ponds at Goodyear Springs is unusual and replicated in few, if any, other locations in the state. Several rare animals, primarily birds of boreal affinity, have been documented as residents of this site.

Management Considerations

The SNA designation would be more effective if it encompassed a broader array of the natural communities representative of this unique landscape, including dry forest (especially in areas with substantial amounts of jack and red pine, balsam fir, or other upland conifers), lowland conifer swamp, shrub swamp, sedge meadow, an additional spring complex, and some length of stream.

the development of a larger block of conifer forest around one or several of the spring and stream complexes would benefit several of the uncommon species resident at this site, such as the boreal birds. More extensive stands of upland coniferous or mixed forest communities (especially balsam fir, and jack and/or red pine) and lowland coniferous types (black spruce and tamarack) would enhance conditions for spruce grouse, gray jay, boreal chickadee and others, by providing more ample habitat of higher quality.

The identification of areas to maintain in a more open condition is also warranted in this part of the NHAL, as only Johnson Lake Barrens SNA and several small wildlife openings are currently managed to maintain an open bracken grassland habitat.

NORTHEAST SPRINGS - JOHNSON CREEK MACROSITE			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
ALDER THICKET		NA	1984
BRACKEN GRASSLAND		NA	1990
LAKE--SHALLOW, SOFT, DRAINAGE		NA	1991
2 NORTHERN DRY FOREST		NA	1988
4 NORTHERN SEDGE MEADOW		NA	1983
3 NORTHERN WET FOREST		NA	1982
OPEN BOG		NA	1977
2 SPRING POND		NA	1983
3 STREAM--FAST, HARD, COLD		NA	1982
STREAM--SLOW, SOFT, COLD		NA	1994
ANIMALS			
CONNECTICUT WARBLER (OPORORNIS AGILIS)		SC/M	1983
GRAY JAY (PERISOREUS CANADENSIS)		SC/M	1985
ZEBRA CLUBTAIL (STYLURUS SCUDDERI)		SC/N	1994
PLANTS			
MARSH WILLOW-HERB (EPILOBIUM PALUSTRE)		SC	1995

18. JOHNSON LAKE AND BARRENS

(Northeast Springs-Johnson Creek Macrosite)

Ecoregion: Northern Highland Pitted Outwash
USGS 7.5' Quadrangle: Tenderfoot Lake
Town-Range-Section: T42N-R8E-secs 8, 9
Size: 271 acres

Site Description

This site is situated on a droughty, sandy outwash plain, and a portion of it has been managed by the use of controlled fire and cutting to promote an open community (bracken grassland) of sweetfern, blueberries, bracken fern, and barrens strawberry. Scattered jack pine and northern pin oak occur amid the openings, with thickets of aspen saplings common along the edges.

Johnson Lake is a shallow, undeveloped drainage lake fed by Garland Creek. The lake is ringed by a wet meadow composed of wire-leaved sedges, patches of open bog, and boggy conifer swamp. The outlet stream (Johnson Creek) and the uplands to the west of the lake also contain ecologically valuable natural features (see "Johnson Creek and Pines"). Johnson Lake has been stocked at least twice in the past.

Site Significance

This site is a designated State Natural Area. It is managed with prescribed fire to restore and maintain the bracken grassland community, and to afford a high level of protection to an undeveloped drainage lake and adjoining wetland. Several rare animals occur here and the lake supports an uncommon plant.

Management Considerations

This site should be considered for strong protective designation. Expanding the open early successional areas would enlarge the bracken grassland community and provide habitat for rare species. Additional protection should be considered for the dry forest (jack pine-red pine-black spruce) to the west, as this community is very poorly represented in special management areas in northcentral Wisconsin, as well as elsewhere within its range. Future stocking of the lake should be carefully reviewed for impact to the aquatic community.

See next site, "Johnson Creek and Pines".

JOHNSON LAKE AND BARRENS			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
BRACKEN GRASSLAND		NA	1995
LAKE--SHALLOW, SOFT, DRAINAGE		NA	1995
NORTHERN SEDGE MEADOW		NA	1995
NORTHERN WET FOREST		NA	1995
STREAM--FAST, HARD, COLD		NA	1995
ANIMALS			
CONNECTICUT WARBLER (OPORORNIS AGILIS)		SC/M	1990
PLANTS			
MARSH WILLOW-HERB (EPILOBIUM PALUSTRE)		SC	1995

19. JOHNSON CREEK AND PINES

(Northeast Springs-Johnson Creek Macrosite)

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Tenderfoot Lake
Town-Range-Section: T42N-R8E-sec. 8 SW 1/4
Size: 394 acres

Site Description

Infertile, rolling outwash sands support a mature dry forest of jack pine, red pine, and black spruce. The understory is composed of bracken fern, blueberries, wintergreen, and barrens strawberry, among others. Some recently harvested stands exhibit very strong jack pine reproduction. Scattered groves and individuals of larger jack and red pine are interspersed with dense thickets of sapling jack pine and herb/low shrub dominated openings.

The hilly landscape is pocked with glacial kettle holes, some of which hold lakes, others containing boggy wetlands. To the south is Johnson Creek, the outlet stream of Johnson Lake, which collects waters from the many spring-fed streams to the northeast. Johnson Creek is bordered by shrub swamp, sedge meadow, and boggy stands of swamp conifers. Lush, within-stream stands of submergent and emergent aquatic macrophytes are significant in some stretches.

Site Significance

This site contains one of the better-developed stands of mature dry conifer forest within the NHAL. The composition of this forest is unusual, especially with regard to the high proportion of black spruce in both the canopy and understory. This site's proximity to Johnson Lake Barrens SNA is advantageous. Expanded, complementary management at Johnson Creek and Pines would significantly broaden the benefits derived from the maintenance and management of the existing SNA.

Much of the forest in this part of the Highland is presently in an aspen coevertype.

Several rare birds have been documented in and around this site. Most are species that typically inhabit stands of dense conifers, and one is associated with the open wetland communities along Johnson Creek.

Management Considerations

This site should be considered for strong protective designation. Fire suppression has been a major ecological factor throughout the ecoregion, but this site adjoins another (Johnson Lake Barrens SNA) that is managed with prescribed fire to maintain open or savanna-like conditions. Extension of this fire regime, or judicious use of some other method designed to maintain the community (not just the coevertype), should also be considered here. This would better represent the gradient of vegetation structures characteristic of communities on droughty, nutrient-poor sites, reduce high-contrast edge, and provide habitat for uncommon and/or declining species.

The Johnson Lake Barrens SNA at the Johnson Creek and Pines site should also be managed for various stages of xeric forest as well, emphasizing, at the other end of the xeric continuum, dense stands of mature conifers.

At least some of the best quality dry forest is on private land. The owners should be contacted to inform them of the ecological values of the site, and to assess their intentions for management of the property.

JOHNSON CREEK AND PINES			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
NORTHERN DRY FOREST		NA	1994
ANIMALS			
ZEBRA CLUBTAIL (STYLURUS SCUDDERI)		SC/N	1994

20. NIXON LAKE COMPLEX

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: White Sand Lake
Town-Range-Section: T42N-R8E-secs. 19, 30; T42N-R7E-secs 23, 24, 25
Size: 1,042 acres

Site Description

The primary natural features of this site include: Nixon Lake, an undeveloped, hardwater drainage lake; Nixon Creek, a free-flowing stream from the outlet of Nixon Lake downstream to a dammed stretch of the Manitowish River; extensive wet meadow (both "poor fen" and tussock meadow) and shrub swamp; and acid conifer swamp and muskeg of black spruce and tamarack.

The uplands support dry to dry-mesic forest vegetation, much of which was recently cut. Major covertypes include white pine, jack pine, trembling aspen, and paper birch. Several small soft water seepage lakes occur in the vicinity of this site and should be included in the complex if further investigation so warrants.

Site Significance

The aquatic features and adjoining wetlands are extensive, in excellent shape, and support rare species. Neither drainage lakes nor wet meadows are well represented in areas with habitat or native community protection designations (such as an SNA) on the NHAL.

Management Considerations

This site should be considered for strong protective designation to ensure long-term maintenance of its wetland and aquatic communities. Periodic monitoring for the presence of invasive species is desirable. Future surveys for breeding birds and boreal Lepidoptera would provide a better understanding of their distribution and use of these habitats in the region.

On the uplands, the continued and expanded management of both dry-mesic and dry pine-dominated forests would provide representative examples of these community types and benefit associated plant and animals species. Future surveys of the entire site for breeding birds would provide a better understanding of habitat needs and sensitivities.

Largescale ecological linkages upstream (ESE) to the Partridge Lake and Lake Alva sites, and downstream (N and W) to the Manitowish River, would provide additional protection to important natural communities and create or maintain migration and travel corridors for various animals.

NIXON LAKE COMPLEX			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
LAKE--SHALLOW, SOFT, DRAINAGE		NA	1994
NORTHERN DRY FOREST		NA	1992
NORTHERN SEDGE MEADOW		NA	1994
PLANTS			
PRICKLY HORNWORT (CERATOPHYLLUM ECHINATUM)		SC	1996
VASEY'S PONDWEED (POTAMOGETON VASEYI)		SC	1996

21 PARTRIDGE LAKE CONNECTION

Ecoregion: Northern Highland Pitted Outwash
USGS 7.5' Quadrangle: White Sand Lake, Star Lake
Town-Range-Section: T42N-R8E-secs. 28, 29, 32, 33
Size: 2,146 acres

Site Description

This site consists primarily of Partridge Lake and the adjoining uplands to the east and south, the lake's outlet stream (Partridge Creek) and its associated wetlands, and McGinnis Creek and its associated wetlands. Portions of this site are wild, undeveloped, and difficult to access. However, forest management has been intensive in some areas, especially northwest of Partridge Lake, north of McGinnis Creek, and southwest of Partridge Creek. Ballard and Partridge Lakes have been stocked many times.

Site Significance

This is one of the few primary sites that contain significant stands of mature, densely stocked black spruce forest. It also occupies a strategic location between Lake Alva Hemlock-Hardwoods and the Star Lake Crescent to the southeast, and Nixon Lake Wetlands Complex to the west.

Management Considerations

Continuing only limited management on this site would benefit the upland and wetland communities found at this site. Additional surveys of the lowlands, shorelines and aquatic features are desirable before specific management decisions are made. Future stocking of the lakes should be carefully reviewed for impact to the aquatic community.

PARTRIDGE LAKE CONNECTION			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
ANIMALS			
BALD EAGLE (HALIAEETUS LEUCOCEPHALUS)	LTNL	SC/FL	1992
OSPREY (PANDION HALIAETUS)		THR	1992

M3. STAR LAKE CRESCENT MACROSITE

Ecoregion:	Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle:	Star Lake, White Sand Lake
Town-Range-Section:	T42N-R8E-secs. 27, 28, 34, 35. T41N-R8E-secs. 1, 2, 11-14, 21-24
Size:	6,012 acres

Survey Sites contained within this macrosite include:

- Lake Alva Hemlock-Hardwoods
- Lake Laura-Salsich Lake
- Plum Lake Hemlock Forest

Site Description

This part of the NHAL features one of the more extensive acreages of mesic forest in the region and is especially notable for its concentration of stands in or approaching old-growth condition. The most abundant canopy trees are hemlock, sugar maple, and yellow birch, with scattered white (rarely red) pine, white cedar, red maple, and paper birch. Typically, sugar maple demonstrates the most vigorous reproduction, but locally there are dense patches of hemlock saplings. Site conditions are not rich in this area, and consequently the understory is most often represented by plants such as Canada mayflower, wood anemone, starflower, big-leaved aster, leatherwood, club mosses, and wood ferns.

Among the additional features of importance in this forested landscape are kettle wetlands consisting of black spruce and tamarack swamp, muskeg, open bog, and emergent aquatic marsh. Several undeveloped lakes are also worthy of mention.

Site Significance

This macrosite encompasses one of the largest areas of old-growth to mature mesic forest in northcentral Wisconsin. One of the sites, "Plum Lake Hemlock Forest", may be the largest stand of old-growth hemlock in the state.

Management Considerations

Excellent potential exists to develop and maintain connections between the three primary survey sites, and to increase stand size and reduce or prevent the development of high-contrast edge. Additional ecological connections to the northwest (via the "Partridge Lake Connection"), south ("Wharton Lake Bog Complex"), and west ("Aurora Lake and Wetlands") are possible and should be considered carefully as this is one of the few state properties on which management at a large (landscape) scale is feasible.

Potential management constraints include the presence of several roads and the current ownership pattern. The NHAL boundary passes through Lake Laura, with private lands on the east shore.

Deer browse is very heavy in some areas and is one of the major factors limiting the widespread reproduction of hemlock, and possibly, other browse-sensitive upland plants.

Both Lake Laura-Salsich Lake and Lake Alva Hemlock-Hardwoods should be considered for strong protective designation, emphasizing the protection and maintenance of an extensive, mature, mesic forest ecosystem, along with associated populations of both rare and representative species, and aquatic features.

STAR LAKE CRESENT MACROSITE			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
2 LAKE--DEEP, SOFT, SEEPAGE		NA	1994
NORTHERN DRY-MESIC FOREST		NA	1981
5 NORTHERN MESIC FOREST		NA	1996
NORTHERN SEDGE MEADOW		NA	1981
ANIMALS			
2 BALD EAGLE (HALIAEETUS LEUCOCEPHALUS)	LTNL	SC/FL	1992
2 BLACK-THROATED BLUE WARBLER (DENDROICA CAERULESCENS)		SC/M	1996
BLACK-TIPPED DARNER (AESHNA TUBERCULIFERA)		SC/N	1962
2 BULL FROG (RANA CATESBEIANA)		SC/H	1994
CERULEAN WARBLER (DENDROICA CERULEA)		THR	1996
LAKE DARNER (AESHNA EREMITA)		SC/N	1994
LAKE EMERALD (SOMATOCHLORA CINGULATA)		SC/N	1994
PINE SISKIN (CARDUELIS PINUS)		SC/M	1996
2 RED-SHOULDERED HAWK (BUTEO LINEATUS)		THR	1980
SUBARCTIC BLUET (COENAGRION INTERROGATUM)		SC/N	1967
2 SWAINSON'S THRUSH (CATHARUS USTULATUS)		SC/M	1992
PLANTS			
LARGE ROUNDEAF ORCHID (PLATANThERA ORBICULATA)		SC	1901
SHORE SEDGE (CAREX LENTICULARIS)		THR	1996

22. LAKE ALVA HEMLOCK-HARDWOODS

(Star Lake Crescent Macrosite)

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Star Lake
Town-Range-Section: T42N-R8E-secs. 27, 28
Size: 424 acres

Site Description

The rolling topography south of Lake Alva features a stand of old-growth mesic forest composed of hemlock, yellow birch, and sugar maple. Very large, very old trees are present, including scattered supercanopy white pine. Yellow birch is present and reproducing. There is evidence of several past episodes of light selective cutting, which have apparently accelerated succession toward greater dominance by maple. Apart from that, the stand is intact, has high canopy cover, and has relatively high ecological integrity.

The lake is undeveloped. Adjoining wetlands, while of small acreage, are diverse in kind and include an open leatherleaf bog, shrub swamp, and an acid conifer swamp of black spruce and tamarack. Around a small pond just to the east of the main lake basin there is a stand of hemlock-white cedar-yellow birch, in which hemlock is reproducing very well.

Past management activities have include selective logging of the hemlock-hardwood forest and the stocking of Lake Alva with game fish.

Site Significance

Old-growth forest remnants, even of the most common and widespread communities, are now rare in northern Wisconsin. Though not large, this site features one of the better old-growth hemlock-hardwood stands in the northcentral portion of the state. The lake and adjoining wetlands are undisturbed and add considerable diversity and significance to the site. This site is a crucial component in a constellation of sites, which in aggregate afford the opportunity to manage a mesic forest complex at a large (landscape) scale.

Several rare animal species are resident here.

Management Considerations

This site merits strong protective designation, and the surrounding forests, especially to the south and east, should be managed compatibly by maintaining high canopy cover, retaining or promoting large trees and snags, etc.. No active management is needed at this time to perpetuate these communities, but monitoring the reproduction of hemlock and yellow birch is desirable. An important consideration is the linkage of this site, via active and passive management, with the large Lake Laura complex to the southeast, and to Partridge Lake, McGinnis Creek, Nixon Lake, and Nixon Creek to the west-northwest.

LAKE ALVA HEMLOCK-HARDWOODS			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
LAKE--DEEP, SOFT, SEEPAGE		NA	1992

LAKE ALVA HEMLOCK-HARDWOODS			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
NORTHERN MESIC FOREST		NA	1992
ANIMALS			
PINE SISKIN (CARDUELIS PINUS)		SC/M	1996
RED-SHOULDERED HAWK (BUTEO LINEATUS)		THR	1980

23. LAKE LAURA-SALSICH LAKE

(Star Lake Crescent Macrosite)

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Star Lake
Town-Range-Section: T41N-R8E-secs. 1, 2, 11-14, 23, 24
Size: 2,580 acres

Site Description

Rolling glacial outwash terrain near the eastern edge of the State Forest is vegetated with an extensive mesic forest that includes old-growth stands as well as mature stands that now possess or are developing some old-growth attributes. Canopy dominance varies from almost pure conifer (hemlock, with some white pine) to pure hardwood (sugar maple, yellow birch, and basswood). Reproduction is primarily by sugar maple, but locally balsam fir is an important sapling or small tree, and hemlock and yellow birch are doing well near Salsich Lake.

The understory is very representative for the mesic forests of this ecoregion: the rich beds of spring ephemerals, so characteristic of mesic stands on richer, siltier soils, are absent here.

The landscape is pitted with glacial kettle holes that contain softwater seepage lakes or boggy wetlands. Among these, Salsich Lake is the most significant because of its size, lack of development, relatively light use history, and diverse aquatic biota. Lake Laura has been stocked with fish at least once, and there are several private cabins on the east shore, east of the State Forest boundary.

Site Significance

This site is large, contains excellent examples of mature mesic forest with a variety of cover types, and at least one exceptional softwater seepage lake (Salsich Lake) is present.

The older successional stages of mesic hardwood forests are poorly represented anywhere in Wisconsin. To date, few have been included in both state and federal special management areas that afford a high level of protection to natural communities.

Numerous rare species, both terrestrial and aquatic, were documented at this site.

Management Considerations

No active management is necessary to perpetuate the natural features occurring here. Monitoring the reproductive success of browse sensitive species such as hemlock and yellow birch is desirable. Current developments are few, and potentially intrusive activities have been handled well by State Forest staff. Linking this site with other sites, including Lake Alva to the northwest and Plum Lake Hemlocks to the southwest, would provide added protection and possible expansion of the natural communities and rare species populations present at this site.

The Lake Laura-Salsich Lake site provides an especially important opportunity for the protection of extensive high quality, older mesic forest, ecologically significant and sensitive aquatic features, undisturbed wetland communities, and rare and representative species preferring these conditions. Future stocking of the lakes should be carefully reviewed for impact to the aquatic community.

LAKE LAURA - SALSICH LAKE			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
LAKE--DEEP, SOFT, SEEPAGE		NA	1994
NORTHERN MESIC FOREST		NA	1996
ANIMALS			
BALD EAGLE (HALIAEETUS LEUCOCEPHALUS)	LTNL	SC/FL	1992
BLACK-THROATED BLUE WARBLER (DENDROICA CAERULESCENS)		SC/M	1996
BULLFROG (RANA CATESBEIANA)		SC/H	1994
CERULEAN WARBLER (DENDROICA CERULEA)		THR	1996
LAKE DARNER (AESHNA EREMITA)		SC/N	1994
LAKE EMERALD (SOMATOCHLORA CINGULATA)		SC/N	1994
SWAINSON'S THRUSH (CATHARUS USTULATUS)		SC/M	1992
PLANTS			
SHORE SEDGE (CAREX LENTICULARIS)		THR	1996

24. PLUM LAKE HEMLOCK FOREST

(Star Lake Crescent Macrosite)

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Star Lake, White Sand Lake
Town-Range-Section: T41N-R8E-secs. 21, 22
Size: 650 acres

Site Description

This site features an older forest of hemlock and associated hardwoods, primarily yellow birch and sugar maple, on rolling outwash topography bordering Star and Plum Lakes. The older stands are in, or are approaching, old-growth condition. The understories of these stands are open and park-like.

The current stand originated in the early 1800s, possibly due to wildfire, and was selectively logged for large white pine in the 1880s. High use by deer in winter has been a factor in limiting reproduction by hemlock.

Several small stands of acid swamp conifers (black spruce and tamarack) occur on the margins of the upland areas.

Site Significance

This site includes the Plum Lake Hemlock Forest State Natural Area and, at present, harbors one of the largest stands (possibly the largest) of old-growth hemlock-hardwood forest in Wisconsin. However, at less than 100 hectares, it is still quite small.

Several rare animal species have been documented here in recent years.

Management Considerations

This site should be considered for strong protective designation. The existing State Natural Area designation is appropriate - extending the designation to include all or parts of the Lake Laura and Lake Alva sites (the "Star Lake Crescent") would increase the site's protection by reducing edge effects and better accommodating natural disturbance events. An excellent opportunity exists to functionally expand the size of this forest, due to the proximity of similar patches of older mesic forest to the north and northeast, which are within a matrix of extensive but much younger, second-growth forest. The expansion of the forest will support the more distinctive plants, animals, and natural processes associated with this ecosystem type. No active management is necessary to perpetuate the mesic forest community, but monitoring the reproductive success of browse-sensitive species, especially eastern hemlock, is desirable. Current regeneration of this species is extremely localized.

The development of a comprehensive plan to expand the size of the older closed canopy forest here and to link it to similar older remnants to the northeast (see Lake Laura and Lake Alva site descriptions) would enhance the long-term sustainability of this community type.

PLUM LAKE HEMLOCK FOREST			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
NORTHERN MESIC FOREST		NA	1988
ANIMALS			
BLACK-THROATED BLUE WARBLER (DENDROICA CAERULESCENS)		SC/M	1980
BULLFROG (RANA CATESBEIANA)		SC/H	1985
SWAINSON'S THRUSH (CATHARUS USTULATUS)		SC/M	1980
PLANTS			
LARGE ROUNDLEAF ORCHID (PLATANThERA ORBICULATA)		SC	1901

25. WHARTON LAKE BOG COMPLEX

Ecoregion: Northern Highland Pitted Outwash
USGS 7.5' Quadrangle: Star Lake, St. Germain
Town-Range-Section: T41N-R8E-secs. 24, 25, 26, 35, 36.
T40N-R8E-secs. 1, 2.
Size: 1,920 acres

Site Description

Rough pitted outwash terrain contains a large complex of kettle bogs, seepage lakes, and wetlands within an upland matrix of intensively managed young aspen forest. The limited survey work conducted here (due to the young age of the upland forest) revealed that the wetlands are of the acid peatland type, a mosaic of open bog, muskeg, and black spruce-tamarack swamp. Sphagnum mosses, ericaceous shrubs, sedges, and insectivorous plants are among the important community members.

Much of the upland forest consists of very young, dense stands of trembling aspen, especially south of Wharton Lake Road. To the north of Wharton Lake Road, white and red pines are important species. Although logging has occurred in many of these stands recently, there is an opportunity to increase both the pine component and overall canopy cover in the foreseeable future.

Site Significance

Important attributes of this site include the extensive acreage of undisturbed peatlands, the numerous undeveloped small seepage lakes, and the opportunity to conduct pinery restoration north and west of Wharton Lake.

Management Considerations

Minimal survey work was done here because the majority of the upland forest was so young. The wetlands and lakes appear essentially undisturbed and should remain that way to protect the community and provide time for more thorough surveys.

The area north and west of Wharton Lake does include selectively cut dry-mesic forest with a significant component of large white pine. This area provides an opportunity for some sort of pinery restoration. The highly significant Lake Laura-Salsich Lake site is just to the north, and Plum Lake Hemlock Forest is not far to the west. Though these other sites occur on a different LTA (Landtype Association) with generally more mesic conditions, both of them could benefit from the local reduction of high contrast edge, an increase in conifer canopy cover, and an overall increase in contiguous forest block size.

WHARTON LAKE BOG COMPLEX			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
OPEN BOG		NA	1996
ANIMALS			
OSPREY (PANDION HALIAETUS)		THR	1992

26. AURORA LAKE AND WETLANDS

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: White Sand Lake
Town-Range-Section: T41N-R8E-secs. 18, 19
Size: 822 acres

Site Description

The primary natural features at this site include an undeveloped, shallow, hard water drainage lake; Aurora Creek, the lake's outlet stream; extensive stands of emergent aquatic vegetation, wet meadow and bog; several small stands of acid swamp conifers (black spruce and tamarack); and second-growth stands of mature red and white pine forest on the adjacent uplands. Aurora Lake has been stocked four times in the past.

Site Significance

The lake and a portion of the adjoining wetlands are within a designated State Natural Area. The aquatic features and associated wetlands are in excellent condition and represent their respective communities well. We support continued, and potentially, expanded protection for this site as it contains features that have been identified as protection priorities for this ecoregion.

Several rare plant and animal species dwell within the confines of Aurora Lake and Wetlands.

Management Considerations

This site should be considered for strong protective designation. Expanding the boundary of the SNA to include other important ecological features would enhance the site's protection. The features include all of the wetlands bordering the lake and stream, the length of the stream south to Razorback Road, and at least some of the adjoining upland forest, which is recovering and has redeveloped some of the attributes of a mature dry to dry-mesic pine forest community.

A long-term management plan for the maintenance and expansion of the pine forests, including an evaluation of the use of prescribed fire, is appropriate here.

The source of water for Aurora Lake is Bear Springs, a modified spring pond approximately 1 mile north of the lake. A review of existing management plans for both areas would be timely and could potentially head off any existing or future conflicts. Future stocking of the lake should be carefully reviewed for impact to the aquatic community.

Additional protection would be provided if the planning process for this site is extended to include Frank Lake, a large undeveloped seepage lake just to the northwest of Aurora Lake, and the two small kettle bogs, "Mary Davis Ries Bogs" to the west. Also, the extensive hemlock-hardwood forest at Plum Lake is a short distance to the east.

No active management is needed for the lake, stream, or wetlands, but periodic monitoring to check for the presence of invasive species or inappropriate uses is needed.

AURORA LAKE AND WETLANDS			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
LAKE--SHALLOW, SOFT, DRAINAGE		NA	1999
NORTHERN DRY-MESIC FOREST		NA	1999
NORTHERN WET FOREST		NA	1999
OPEN BOG		NA	1999
ANIMALS			
BALD EAGLE (HALIAEETUS LEUCOCEPHALUS)	LTNL	SC/FL	1992
BULLFROG (RANA CATESBEIANA)		SC/H	1994
EVENING GROSBEAK (COCCOTHAUSTES VESPERTINUS)		SC/M	1994
SUBARCTIC BLUET (COENAGRION INTERROGATUM)		SC/N	1967
PLANTS			
SWAMP PINK (ARETHUSA BULBOSA)		SC	1994

27. MARY DAVIS RIES BOGS

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: White Sand Lake
Town-Range-Section: T41N-R7E-sec. 24 NE1/4NE1/4; T41N-R8E-sec. 19 NW1/4NW1/4
Size: 77 acres

Site Description

Rough pitted glacial outwash between Frank and Aurora Lakes contains several steep-sided depressions. The deepest of these contains two small kettle bogs, each consisting of a small open pond bordered by a mat of sphagnum mosses, sedges and ericaceous shrubs. The surrounding forests are managed forests composed mostly of aspen, paper birch, and, to the south, young pine plantations.

Site Significance

Each of the kettle bogs supports rare aquatic invertebrates.

Management Considerations

The access road to Frank Lake passes over a narrow isthmus between the two bogs. Protection of site hydrology is critical. Any activities that would alter water chemistry or change water levels should be avoided until the impacts can be evaluated.

MARY DAVIS RIES BOGS			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
ANIMALS			
BLACK-TIPPED DARNER (AESHNA TUBERCULIFERA)		SC/N	1991
CITRINE FORKTAIL (ISCHNURA HASTATA)		SC/N	1962

28. FRANK LAKE AND FROST POCKET

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: White Sand lake
Town-Range-Section: T41N-R7E-sec. 13 E1/4; T41N-R8E-sec. 18 W1/2
Size: 338 acres

Site Description

Frank Lake is a 141 acre undeveloped soft water seepage lake with slightly alkaline, clear water of high transparency. Sand is the primary bottom material, with rock, gravel, and muck also present. The rolling sandy uplands are forested with second-growth stands of dry-mesic northern hardwoods (paper birch, aspen, red maple, red oak). The lake has been stocked twice in the past.

Less than a quarter mile north of Frank Lake is an open, 18-acre dry depression that apparently will not support a forest community because of periodic growing season frosts. Heavy frost damage (die-back) on this year's growth was evident in late June on some of the conifers (white pine and white spruce) planted in and on the margins of the "frost pocket". The vegetation is composed mostly of herbs and low shrubs, with non-native species being very common. The natives include blueberries, bracken fern, Kalm's brome grass, lousewort, rice grass, and dense sods of Penn sedge. Among the exotics, orange hawkweed, ox-eye daisy, Canada bluegrass, and sheep sorrel were typical.

Site Significance

Lakes of this type and size are currently under very heavy development pressure throughout northern Wisconsin. Frost pockets are poorly understood and are of potentially high research value.

Management Considerations

This waterbody is a designated Wild Lake in the current property master plan. Minimizing additional development on or around the lake would help to maintain the current character of the aquatic community. Any management of the lake should emphasize the maintenance of the aquatic community. Future stocking of the lake should be carefully reviewed for impact to the aquatic community.

The frost pocket should be considered for special management designation. While this is not necessarily the best site to consider for such recognition, it is one of the large ones.

There are contextual considerations here, as other significant sites occur just to the southeast (Aurora Lake), south (Mary Davis Ries Bogs), and a short distance to the west (Blueberry Lake, Central Highlands Macrosite).

FRANK LAKE AND FROST POCKET			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
BRACKEN GRASSLAND		NA	1992
LAKE--DEEP, SOFT, SEEPAGE		NA	NA

29. BLUEBERRY LAKE

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: White Sand Lake
Town-Range-Section: T41N-R7E-sec. 23
Size: 89 acres

Site Description

Blueberry Lake is a small, infertile seepage lake within a deep kettle depression in pitted glacial outwash. The 12 acre lake is 27 feet deep and has a mostly muck bottom. The lake is bordered on the northwest and northeast by an open bog mat composed of sphagnum mosses, sedges, ericaceous shrubs, and insectivorous plants. Small black spruce and tamarack are scattered within the mat. The adjoining uplands support second growth stands of dry-mesic forest consisting of paper birch, red oak, maples, balsam fir, and some white and red pines. Extensive plantations occur to the east and north.

Just to the south is a second small kettle bog ("Blueberry Junior"), which has only an acre or two of open water surrounded on all sides by open bog, muskeg, and acid conifer swamp communities. Chemical treatment was proposed for Blueberry Lake twenty years ago but we are not aware that this ever occurred.

Site Significance

This site is known for its diverse and showy flora. A number of research projects have used Blueberry Lake as a study site. This site contains small but good representatives of several wetland communities characteristic of this ecoregion.

Management Considerations

Because of the site's close proximity to Big Muskellunge Lake Road, the impact of recreational uses on the vegetation should be studied. If chemical treatment is proposed in the future, the potential impacts should be reviewed carefully.

BLUEBERRY LAKE			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
LAKE--DEEP, SOFT, SEEPAGE		NA	1980
OPEN BOG		NA	1980
PLANTS			
HIDDEN-FRUITED BLADDERWORT (UTRICULARIA GEMINISCAPA)		SC	1985
SWAMP PINK (ARETHUSA BULBOSA)		SC	1959

30. PLUM CREEK

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Sayner
Town-Range-Section: T40N-R8E-secs. 6, 7, 18; T41N-R8E-sec. 31.
Size: 144 acres

Site Description

Plum Creek flows southward from Plum Lake to Big St. Germain Lake, a distance of 4.7 miles. Average width is 18 feet, the water is clear with moderate fertility, and the bottom materials are mostly sand and gravel. The channel is confined within a steep-sided and rather straight valley, running through an almost level sandy outwash plain. The uplands are mostly forested, with xeric community types (including pine plantations) predominant.

Site Significance

Plum Creek is a very good example of a stream type that is common on the NHAL - a small, cool to warmwater stream, originating in a large lake and flowing to another lake.

The stream supports a diverse macroinvertebrate fauna, which includes rare species. One of these is globally rare.

Management Considerations

Protection of stream hydrology and water quality is paramount to maintaining the aquatic community and rare species at this site. The stream is managed for trout (both native and exotic species) and extensive bank modifications have been made in some areas to improve the sport fishery. Impacts of these modifications on the native aquatic invertebrate community are uncertain.

Potential sources of water quality degradation are the two county highway crossings and the campground at Plum Lake.

PLUM CREEK			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
ANIMALS			
SPLENDID CLUBTAIL (GOMPHURUS LINEATIFRONS)		SC/N	1994
ZEBRA CLUBTAIL (STYLURUS SCUDDERI)		SC/N	1994

M4. CENTRAL HIGHLAND MACROSITE

Ecoregion:	Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle:	White Sand Lake, Boulder Junction, Woodruff, Sayner, Lake Tomahawk
Town-Range-Section:	T39N-R7E-secs. 3, 4, 9, 10, 12, 13, 15, 16, 21-24, 26, 27, portions of 1, 2, 11, 14; T39N-R8E-secs. 6, 7; T40N-R6E sec. 7; T40N-R7E secs. 3, 6, 7, 10-13, 17-21, 27-29, 34, portions of 4, 5, 8, 9, 14-16, 22-26, 35, 36; T40N-R8E secs. 18, 19, 30, 31; T41N-R7E secs. 1, 2, 4, 5, 8, 10-17, 20-23, 27-29, 31, 32, 34, 35, portions of 3, 9, 33.
Size:	28,091 acres

Survey Sites contained within this macrosite include:

- Escanaba Lake Hemlocks
- Lost Canoe Hardwoods
- Stevenson Creek and Pines
- Allequash Lake and Pines
- Little John Junior Lake
- Benedict-Hurrah-Scaffold Lakes Complex
- Dry Lake and Pines
- Bittersweet Lakes Complex
- Mud Creek Springs
- Sweeney Lake Area

Site Description

This “macrosite” occupies the heart of the Northern Highland, stretching from Lost Canoe Lake on the north to Sweeney Lake on the south. Terrain is generally rolling, with many kettle lakes, spring ponds, and wetlands. The uplands are almost entirely forested, with both mesic and dry-mesic communities well represented. Though the entire area was cut over and much of it burned during the catastrophic logging of the late nineteenth and early twentieth centuries, most stands have retained an approximation of the natural composition for these forest types in this ecoregion and many of them are mature and developing old-growth structural characteristics.

Rough, sandy outwash topography supports extensive managed forests of white and red pine, hemlock-hardwoods, northern hardwoods, aspen and paper birch, plus numerous kettle wetlands containing open bog, poor fen, muskeg, black spruce swamp, tamarack swamp, alder thicket, and spring pond communities.

Site Significance

At a large scale (over 1000 acres), this is one of the more ecologically intact forested portions of the NHAL. Stands of intensively managed aspen and plantation-grown pine are relatively scarce here. Many of the existing stands of dry-mesic (white pine-red pine) and mesic forest (“northern hardwoods” of sugar maple-yellow birch-basswood and hemlock) now possess or are developing old-growth attributes. At present, old-growth forests are rare, large patches of older forest are nonexistent, and large patches of older maturing forest are uncommon.

Management Considerations

This complex of sites affords one of the best opportunities on state lands for largescale ecosystem management and protection. Options for management include enhancement of present conditions by increasing forest block size, increasing stand age, and, where appropriate and feasible, increasing the coniferous component of the existing stands.

Opportunities to create ecological linkages with the forests of the Upper Peninsula of Michigan are important landscape level considerations.

The oligotrophic seepage lakes found here are highly vulnerable to degradation due to acidification if local or regional air quality deteriorates.

CENTRAL HIGHLANDS MACROSITE			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
EMERGENT AQUATIC		NA	1992
5 LAKE--DEEP, VERY SOFT, SEEPAGE		NA	1992
LAKE--SHALLOW, HARD, SEEPAGE		NA	1980
2 LAKE--SHALLOW, SOFT, DRAINAGE		NA	1995
LAKE--SHALLOW, SOFT, SEEPAGE		NA	1996
6 NORTHERN DRY-MESIC FOREST		NA	1996
5 NORTHERN MESIC FOREST		NA	1995
2 NORTHERN SEDGE MEADOW		NA	1996
2 OPEN BOG		NA	1996
2 POOR FEN		NA	1996
SPRING POND		NA	1977
STREAM--FAST, HARD, COLD		NA	1977
SUBMERGENT AQUATIC		NA	1992
ANIMALS			
A CADDISFLY (BANKSIOLA DOSSURIA)			1994
7 BALD EAGLE (HALIAEETUS LEUCOCEPHALUS)	LTNL	SC/FL	1997
BANDED KILLFISH (FUNDULUS DIAPHANUS)		SC/N	1975
BLACK TERN (CHLIDONIAS NIGER)		SC/M	1992
2 BLACK-TIPPED DARNER (AESHNA TUBERCULIFERA)		SC/N	1994
BULL FROG (RANA CATESBEIANA)		SC/H	1986
CERULEAN WARBLER (DENDROICA CERULEA)		THR	1988
CYRANO DARNER (NASIAESCHNA PENTACANTHA)		SC/N	1994
FOUR-TOED SALAMANDER (HEMIDACTYLUM SCUTATUM)		SC/N	1996
LAKE DARNER (AESHNA EREMITA)		SC/N	1991
LONG-EARED OWL (ASIO OTUS)		SC/M	1988
3 MOTTLED DARNER (AESHNA CLEPSYDRA)		SC/N	1994
NORTHERN RINGNECK SNAKE (DIADOPHIS PUNCTATUS EDWARDSII)		SC/N	1996
7 OSPREY (PANDION HALIAETUS)		THR	1992
PLANTS			
3 AMERICAN SHORE-GRASS (LITTORELLA AMERICANA)		SC	1995
4 NORTHEASTERN BLADDERWORT (UTRICULARIA RESUPINATA)		SC	1996
PURPLE CLEMATIS (CLEMATIS OCCIDENTALIS)		SC	1957
3 ROBBINS SPIKERUSH (ELEOCHARIS ROBBINSII)		SC	1996
SHORE SEDGE (CAREX LENTICULARIS)		THR	1995

31. ESCANABA LAKE HEMLOCKS

(Central Highlands Macrosite)

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: White Sand Lake
Town-Range-Section: T41N-R7E-sec. 2
Size: 308 acres

Site Description

A steep-sided knob on the southeast side of Escanaba Lake supports a stand of old-growth mesic forest dominated by large hemlock. Canopy associates include yellow birch, paper birch, red maple, and rarely, sugar maple. Scattered supercanopy white pine are present. The understory is generally open and park-like, composed mostly of Canada mayflower, wood ferns, and clubmosses. Thickets of balsam fir saplings and mountain maple occupy canopy gaps. Hemlock saplings are rare and those present have been browsed by deer.

A boggy conifer swamp composed of small to pole-size tamarack and black spruce borders the hemlock stand on three sides. Escanaba Lake, a very scenic waterbody with minimal developments and a long history of fisheries research, is the western border of this site. Common loon, bald eagle, and osprey were noted on or around the lake during the 1992 field season.

Site Significance

This site was established as a State Natural Area to recognize a small stand of old-growth mesic forest and an adjoining conifer swamp. Old-growth stands of the widespread mesic forest community are now very rare in the Wisconsin landscape, and the extent of hemlock has diminished greatly.

Several rare animals have been documented here.

Management Considerations

This site should be considered for strong protective designation. No active management is needed to perpetuate the communities present at this time, however, there is little or no reproduction by the dominant trees, hemlock and yellow birch. The very small size (ca 25 acres) and isolation of the old-growth stand is a concern and may be a serious viability limitation. Uplands to the east and south should be considered for restoration.

ESCANABA LAKE HEMLOCKS			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
NORTHERN MESIC FOREST		NA	1992

32. LOST CANOE HARDWOODS

(Central Highlands Macrosite)

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: White Sand Lake
Town-Range-Section: T42N-R7E-secs. 34, 35; T41N-R7E-secs. 2, 3
Size: 504 acres

Site Description

The isthmus between Lost Canoe, Escanaba, and Pallette Lakes contains a mature second-growth forest of red oak, red maple, paper birch, and sugar maple. Large white pines are common, scattered throughout the site, and beginning to form a supercanopy. Several small kettle depressions hold boggy wetlands and/or small ponds.

Pallette Lake is entirely undeveloped (though it has been stocked 13 times), Escanaba has only a boat access and DNR Fish Research facility, and Lost Canoe has limited private developments on its north side.

Site Significance

Little or no tree harvest has occurred on the isthmus since the initial cutover, hence the forest there exhibits more characteristics of an older stand than is common in the NHAL at this time. Older oak-pine forests are uncommon throughout northern Wisconsin and this site features a very good example of a mature "recovered" dry-mesic northern hardwoods forest.

The lakes and nearby patches of older conifer forest support rare species.

Management Considerations

This site should be considered for strong protective designation due to contextual attributes. The three lakes are, for the most part, undeveloped or have experienced only light development. Escanaba Lake State Natural Area protects a small stand of old-growth hemlock-hardwood forest and conifer swamp on the east side of Escanaba Lake. Stevenson Springs, a biologically interesting complex of wetlands and managed pine forest, is just to the west of Pallette Lake. Rare species occur in several of these communities and would benefit from additional protection and compatible management.

As present land uses emphasize aesthetics and relatively passive forms of recreation, strong protective designation would be appropriate to further promote, protect, interpret, and recognize the natural features found here.

LOST CANOE HARDWOODS			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
LAKE--DEEP, VERY SOFT, SEEPAGE		NA	1992
NORTHERN DRY-MESIC FOREST		NA	1992

33. STEVENSON CREEK AND PINES

(Central Highlands Macrosite)

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: White Sand Lake, Boulder Junction
Town-Range-Section: T41N-R7E-secs. 3 W1/2, 4 NE1/4
T42N-R7E-sec34 SW1/4, 33 E1/2SE1/4
Size: 189 acres

Site Description

Stevenson Creek originates from the base of rolling sandy ridges just west of Palette Lake and flows west two miles into Trout Lake. A water control structure has partially impounded the uppermost portions of the creek, which is bordered by an extensive floating mat of wire-leaved sedges. The open waters support an emergent marsh of very good quality composed mostly of wild rice, yellow water lily, bur-reed, and pondweeds.

The uplands support second-growth dry-mesic forests composed of white pine, red maple, paper birch, and red pine. Some of these stands had been cut recently, but pines remain dominant.

Site Significance

The wetland communities are of very good quality, and wire-leaved sedge mats are uncommon in the region. The upland forests, though second-growth and recently thinned, remain dominated by pine and should stay that way.

Management Considerations

This site should be considered for strong protective designation. It is an interesting, fairly remote complex that would benefit by maintaining the present management regime. The pine forest could benefit from longer rotations to complement the significant natural features just to the east (Lost Canoe Hardwoods, Escanaba Lake).

STEVENSON CREEK AND PINES			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
POOR FEN		NA	1994

34. ALLEQUASH LAKE AND PINES

(Central Highlands Macrosite)

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Boulder Junction
Town-Range-Section: T41N-R7E-secs. 16, 17, 20, 21.
Size: 1,055 acres

Site Description

This site is centered on the shallow south basin of Allequash Lake, a large drainage lake located five miles south of Boulder Junction. This basin supports lush, diverse beds of emergent, submergent, and floating-leaved aquatic vegetation. Among the birds nesting in the aquatic beds and on the margins of the lake are several rare species. The lake itself (at least the deep north basin) is managed for game fish and has been stocked many times. The only development on the lake is a boat landing, which periodically receives heavy use.

The shoreline is primarily upland and forested with mature second-growth stands of white pine, red oak, red maple, paper birch, balsam fir, and sugar maple. More mesic patches of forest also occur, perhaps being best developed on the south side of the basin where hemlock is dominant, and yellow birch and sugar maple make up the remainder of the canopy. Stands vary in structure and quality, but in those exhibiting the best recovery from past logging, large trees and some snags are present and a pine supercanopy is developing.

Site Significance

The aquatic communities are exceptional and support a diverse complement of native species including several that are quite rare. The forest around the south basin of Allequash Lake is mature and developing the characteristics of later successional stage forests such as large trees, standing snags, coarse woody debris, and in some areas, a white pine supercanopy. Adjoining and nearby forests possess few of these attributes.

Management Considerations

This site is entirely within the Frank Lake Wild Area but should be considered for additional recognition and a greater level of protection based on its ecological attributes. The lake basin and aquatic communities should be monitored periodically for the presence of introduced invasive species. Future stocking of the lake should be carefully reviewed for impact to the aquatic community.

In the long-term, development of a management methodology and plan is desirable for the dry-mesic forest at this site (and elsewhere on the NHAL) to ensure that important community components are not lost. This includes, but is not limited to, canopy species such as white pine and red oak. Because similar stands in the vicinity of this site have been logged recently, often with a substantial reduction in canopy cover (e.g., well over 50% in stands just to the east of this site), it is important to maintain existing stands of older closed canopy forest in this area. This will provide structural features that are relatively scarce in the local landscape, provide forest interior conditions for those species that require them, and complement the highly significant wetlands and aquatic features also present at this site.

ALLEQUASH LAKE AND PINES			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
EMERGENT AQUATIC		NA	1992
LAKE--SHALLOW, SOFT, DRAINAGE		NA	1992
NORTHERN DRY-MESIC FOREST		NA	1994
NORTHERN MESIC FOREST		NA	1994
SUBMERGENT AQUATIC		NA	1992
ANIMALS			
BALD EAGLE (HALIAEETUS LEUCOCEPHALUS)	LTNL	SC/FL	1992
BLACK TERN (CHLIDONIAS NIGER)		SC/M	1992
BULLFROG (RANA CATESBEIANA)		SC/H	1986
OSPREY (PANDION HALIAETUS)		THR	1992

35. LITTLE JOHN JUNIOR LAKE

(Central Highlands Macrosite)

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Boulder Junction
Town-Range-Section: T41N-R7E-sec. 29 NE1/4NE1/4, 28NW1/4NW1/4
Size: 49 acres

Site Description

Little John Junior is a deep seepage lake of extremely low fertility. The bottom materials are mostly sand and gravel, that in some areas occur under a very thin layer of organic sediments. No developments are present, but the lake was chemically treated and then stocked in the past in an attempt to improve the sport fishery.

Site Significance

Deep, ultra-soft, hard-bottomed seepage lakes are better represented on the NHAL than anywhere else in the state or region. Rare plants and animals, some with unusual adaptations to the extreme conditions exhibited by these waterbodies, occur here, and are significant occurrences for the forest and the region.

Management Considerations

Little John Junior should be considered for strong protective designation to ensure the maintenance of its highly significant biological values. Deep seepage lake types are highly vulnerable to development because of their firm bottoms, clear soft water, low density of aquatic vegetation, and high aesthetic qualities. As they are so poorly buffered naturally, they are also at high risk of acidification and degradation should air quality deteriorate further. Chemical treatment and other management that alters the aquatic community should be carefully reviewed for impact.

No developments are present on the shoreline at this time but a road does occur just to the north of the lake. Increased access has the potential to negatively impact the aquatic communities of this lake.

LITTLE JOHN JUNIOR LAKE			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
LAKE--DEEP, VERY SOFT, SEEPAGE		NA	1995
ANIMALS			
BLACK-TIPPED DARNER (AESHNA TUBERCULIFERA)		SC/N	1966
LAKE DARNER (AESHNA EREMITA)		SC/N	1991
MOTTLED DARNER (AESHNA CLEPSYDRA)		SC/N	1991
PLANTS			
AMERICAN SHORE-GRASS (LITTORELLA AMERICANA)		SC	1995
NORTHEASTERN BLADDERWORT (UTRICULARIA RESUPINATA)		SC	1995
ROBBINS SPIKERUSH (ELEOCHARIS ROBBINSII)		SC	1975

36. BENEDICT-HURRAH-SCAFFOLD LAKES COMPLEX

(Central Highlands Macrosite)

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Woodruff, Sayner
Town-Range-Section: T40N-R7E-secs. 7, 8, 9, 17
Size: 2,438 acres

Site Description

Rough pitted outwash terrain is covered by extensive second-growth forest composed mostly of hardwoods. Site conditions vary from mesic to dry-mesic, with small, scattered wet pockets. The canopy dominants include sugar maple, paper birch, yellow birch, red oak, and red maple. Conifers are uncommon, though white pine is present in a few areas and small balsam fir occur throughout the site. Though most of the trees are of poletimber or small sawtimber size, scattered individuals exceeding 20" d.b.h. are present, including some very large yellow birches. A small "island" of old-growth hemlock-spruce-fir occurs near Scaffold Lake.

The site includes seven small, undeveloped soft water seepage lakes, the largest among them being Benedict Lake at 26 acres. Two of the lakes are deep and possess firm bottoms. The others are soft-bottomed.

Site Significance

The mesic forest community is widespread throughout northern Wisconsin, though in the Northern Highland landscape it does not comprise the matrix vegetation as it does on the richer soils of the ecoregions to the east, west, and north. Missing attributes for this type in the present landscape include older successional stages, large patch sizes, and a significant component of conifers. Dry-mesic site conditions are also present and very old, well-rotted pine stumps are scattered in various locations within the site.

This site is large, has relatively few roads, and does not include a significant acreage of intensively managed cover types (little or no aspen or plantation-grown pine occurs here). The existing forest cover includes scattered large trees and a few snags, and the lakes and wetlands are undeveloped and essentially undisturbed. A few very small pockets of old-growth conifer forest are present. Sites with similar or compatible attributes occur to the east and southeast.

Rare plants were documented in aquatic and wetland habitats at this site, and one rare herptile was captured here in the mid-1980s (species not included in the site table-see page B-1).

Management Considerations

This site should be considered for strong protective designation because of the significance described above. This and nearby sites cluster well, and collectively would seem to be a logical choice for considering some sort of big block management. This could entail favoring the maintenance or development of high canopy closure and old-growth structural characteristics, increased conifer cover, and affording a high level of protection to the wetlands and aquatic features. An important consideration is to coordinate management here with that of sites to the east and north. See **Dry Lake and Pines, Bittersweet Lakes, Central Highlands Macrosite**.

BENEDICT - HURRAH - SCAFFOLD LAKES COMPLEX			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
LAKE--SHALLOW, SOFT, SEEPAGE		NA	1996
NORTHERN SEDGE MEADOW		NA	1980
OPEN BOG		NA	1992
NORTHERN MESIC FOREST		NA	1992
PLANTS			
ROBBINS SPIKERUSH (ELEOCHARIS ROBBINSII)		SC	1996

37. DRY LAKE AND PINES (AKA LUCIUS BAY PINES)

(Central Highlands Macrosite)

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Woodruff, Sayner
Town-Range-Section: T40N-7E-sec. 21, 20
Size: 863 acres

Site Description

The rolling sandy terrain between Lucius Bay of Big Arbor Vitae Lake and Dry Lake is forested with stands of large white and red pines. Canopy associates include red oak, red maple, and paper birch. Balsam fir saplings are abundant, and the shrub layer consists of beaked hazelnut and hardwood saplings. Old-growth characteristics are developing in this stand.

The site includes three lakes including a 106 acre shallow drainage lake and a 44 acre shallow seepage lake.

Site Significance

This is the oldest known white pine stand on the NHAL. Other significant natural features, including mesic and dry-mesic forests, undeveloped lakes, springs, and a stream, occur immediately to the east and northwest of this site.

Several rare animals were documented here.

Management Considerations

This site is within a large complex of natural features that should receive consideration for strong protective designation. In addition to the individual stands of older conifer forest and undeveloped lakes in the vicinity, the extensive, relatively unfragmented forest and the absence of plantation-grown pine and short rotation aspen is important. This is one of the few areas on the State Forest that presently offers an opportunity to protect and manage a forested landscape at a largescale. See **Bittersweet Lakes** and **Benedict-Hurrah-Scaffold Lake Complex** for additional information.

DRY LAKE AND PINES			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
NORTHERN DRY-MESIC FOREST		NA	1993
ANIMALS			
CYRANO DARNER (NASIAESCHNA PENTACANTHA)		SC/N	1994
MOTTLED DARNER (AESHNA CLEPSYDRA)		SC/N	1994
OSPREY (PANDION HALIAETUS)		THR	1992

38. BITTERSWEET LAKES COMPLEX

(Central Highlands Macrosite)

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Sayner
Town-Range-Section: T40N-R7E-secs. 15, 16, 22, 21
Size: 1,672 acres

Site Description

The rough pitted outwash topography of this site contains several deep, softwater seepage lakes within an extensive matrix of dry-mesic to mesic forest. The lakes are undeveloped, with clear water of extremely low fertility. The aquatic flora includes many members of the highly specialized "sterile rosette" group, which includes several rare species. Past management of the lakes has included stocking: 15 times at Bittersweet and twice at Prong. Catch and release regulations apply to these lakes. There are no known records of stocking at Smith or Oberlin Lakes.

Although the forest is mostly second-growth, composed of species such as red oak, red maple, paper birch, and balsam fir, there are older stands of hemlock-hardwoods and white pine-red pine to the north and west of the lakes. Excellent reproduction of hemlock was noted in several areas.

Site Significance

This site includes the Bittersweet Lakes State Natural Area and encompasses excellent examples of deep softwater seepage lakes, mesic hemlock-hardwood forest, and dry-mesic white pine-red pine forest. In aggregate, these major features, along with the others present, represent this portion of the Northern Highlands landscape very well.

A number of rare species occur at this site, in both terrestrial and aquatic habitats.

Management Considerations

The Bittersweet Lakes Complex should be considered for strong protective designation. This site could serve as a core to a suite of natural features highly representative of this ecoregion, surrounded by lands and waters managed under complementary regimes to derive benefits of scale and landscape level diversity. The NHAL is one of very few state properties for which this potential exists, because of its size, the kinds of natural features it contains, and its context.

The expansion of the existing State Natural Area boundary to the north, south, and west would incorporate and protect older stands of hemlock-hardwoods, white pine-red pine forest, significant aquatic features, and rare species habitat.

The forest immediately to the east has been cut recently, but a number of large white pine were retained, providing a management focus opportunity in the future. A bit farther to the east is an important pine forest-wetland complex (**Mud Creek Springs**) and much of the surrounding forest to the north and south of this site could be considered for pinery restoration.

Future stocking of the lakes should be carefully reviewed for impact to the aquatic community.

BITTERSWEET LAKES COMPLEX			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
LAKE--DEEP, VERY SOFT, SEEPAGE		NA	1992
NORTHERN DRY-MESIC FOREST		NA	1992
NORTHERN MESIC FOREST		NA	1992
ANIMALS			
BALD EAGLE (HALIAEETUS LEUCOCEPHALUS)	LTNL	SC/FL	1992
BLACK-THROATED BLUE WARBLER (DENDROICA CAERULESCENS)		SC/M	1992
CERULEAN WARBLER (DENDROICA CERULEA)		THR	1988
LONG-EARED OWL (ASIO OTUS)		SC/M	1988
PLANTS			
AMERICAN SHORE-GRASS (LITTORELLA AMERICANA)		SC	1975
NORTHEASTERN BLADDERWORT (UTRICULARIA RESUPINATA)		SC	1996

39. MUD CREEK SPRINGS

(Central Highlands Macrosite)

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Sayner
Town-Range-Section: T40N-R7E-secs. 23 E1/2, 24 W1/2, 25 NW1/4, 26 NE1/4
Size: 979 acres

Site Description

A spring pond at the base of a steeply-sloping sandy outwash landform is the headwaters of Mud Creek, which flows eastward through a large boggy peatland to Big St. Germain Lake.

The peatland contains very good stands of forested bog (black spruce-tamarack swamp), muskeg, open bog, and poor fen communities. Deep basins in the nearby outwash in the southwestern corner of the site contain excellent kettle bogs (e.g., "Butterfly Lake"). The uplands around the wetlands support second-growth forest. To the north and west young aspen stands are prominent, but to the east, and on small upland "islands" within the peatland there are some older stands of red and white pines.

Site Significance

This is one of the better representative wetland complexes within the State Forest, offering an opportunity to protect a continuum of good quality acid peatland communities along with small stands of older pine forest. There are logical opportunities to link this site to others, especially to the west. This could be done by promoting longer-lived conifers (and hardwoods such as red oak) where appropriate, and insuring that the wetlands and older pine stands are not isolated by the intensive management of intervening stands.

Management Considerations

This site should be considered for strong protective designation. Protecting the wetlands from hydrologic disruption and the introduction of invasive species would maintain this important wetland complex. Older stands of pine-dominated forest would benefit from community type-based management rather than cover type management. A significant portion of these forests should be considered for old-growth or other native community classification. The more intensively managed forest to the west (mostly dense stands of young trembling aspen with scattered large white pine) has the potential to provide an eventual increase in conifer cover through extended rotation, and should be viewed as an important component in a landscape scale forest management plan.

MUD CREEK SPRINGS			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
NORTHERN DRY-MESIC FOREST		NA	1996
NORTHERN SEDGE MEADOW		NA	1996
OPEN BOG		NA	1996
POOR FEN		NA	1996

40. SWEENEY LAKE AREA

(Central Highlands Macrosite)

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Lake Tomahawk
Town-Range-Section: T39N-R7E-secs. 14, 15, 22, 23.
Size: 328 acres

Site Description

The major natural features of this site are a large undeveloped drainage lake, a small stand of old-growth hemlock forest, and a complex of small bog ponds with adjoining open bog and black spruce swamp communities. Part of the hemlock stand was heavily damaged by a severe windstorm recently.

Sweeney Lake has a maximum depth of 18 feet, bottom materials of sand, rubble, and gravel, and clear, soft, water of moderate transparency. No developments are present on the shore with the exception of a parking area and boat launch. Two small headwater streams enter the lake on its southwest side. The outlet, Sweeney Creek, flows from the northeast side of the lake eastward to Gilmore Lake and the Wisconsin River. The lake has been stocked on numerous occasions (at least 27).

The wetlands have not been surveyed in detail. A Great Blue Heron rookery formerly existed northeast of Sweeney Lake but has been abandoned.

Site Significance

Lakes, especially large lakes in this part of Wisconsin, are currently under heavy development pressure. This site provides a unique opportunity to maintain a large lake aquatic community without development. More detailed surveys should be done at this site to identify the wetland types present and the potential for rare species.

Management Considerations

The surrounding landscape is extensively forested with second-growth stands of pine and northern hardwoods. The feasibility of largescale management and restoration of older, conifer-dominated, or mixed conifer-hardwood forests seems feasible here. The present vegetation in the local landscape contains a relatively limited acreage of highly disturbed, intensively managed aspen, paper birch, or plantation-grown pine. The site may qualify for special protective designation because of the aquatic community type and the lack of development.

Future stocking of the lake should be carefully reviewed for impact to the aquatic community.

SWEENEY LAKE AREA			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
LAKE--SHALLOW, SOFT, DRAINAGE		NA	1995
NORTHERN MESIC FOREST		NA	1995
ANIMALS			
BALD EAGLE (HALIAEETUS LEUCOCEPHALUS)	LTNL	SC/FL	1992

41. TROUT RIVER

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Boulder Junction, Manitowish Lake
Town-Range-Section: T41N-R6E-secs. 14-16, 21, 22
Size: 185 acres

Site Description

The Trout River is a slow, warm, alkaline stream with clear water of high fertility that flows west and north from its source at Trout Lake, eventually joining the Manitowish River west of the state forest boundary. The Trout averages 30 feet in width and has a maximum depth of 3 feet. Bottom materials are mostly sand and gravel and the current moderate to fast, though there are wide, slow stretches where muck is the primary substrate. Patches of aquatic vegetation are common in the lower reaches. Portions of the shoreline are in private ownership, including a golf course.

The fauna may be characterized as “cool” to “warmwater” in nature.

Site Significance

The aquatic life of this stream is rich in insects, fish, and mussels and among these are many rare species.

Management Considerations

This stream should be considered for strong protective designation. Changes to the current water quality characteristics would negatively impact the rare aquatic animals found here. Surrounding land uses (including non-state owned lands) should be evaluated for potential impacts.

TROUT RIVER			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
ANIMALS			
BANDED KILLFISH (FUNDULUS DIAPHANUS)		SC/N	1985
GREATER REDHORSE (MOXOSTOMA VALENCIENNESI)		THR	1984
LEAST DARTER (ETHEOSTOMA MICROPERCA)		SC/N	1985
LONGEAR SUNFISH (LEPOMIS MEGALOTIS)		THR	1993
PUGNOSE SHINER (NOTROPIS ANOGENUS)		THR	1985
ROUND PIGTOE (PLEUROBEMA SINTOXIA)		SC/H	1997
SPLENDID CLUBTAIL (GOMPHURUS LINEATIFRONS)		SC/N	1997

42. EAST ELLERSON LAKE AND DRUMLIN

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Manitowish Lake, Boulder Junction
Town-Range-Section: T41N-R6E-sec. 28 W1/2, SW1/4NE1/4, NW1/4SE1/4
Size: 136 (lake only); 641 acres (total)

Site Description

East Ellerson Lake, a deep, soft, drained lake, features clear water and a mostly sand bottom. Aquatic vegetation is generally sparse, and includes specialized plants from the "sterile rosette" group including water lobelia, quillwort, and pipewort. The small outlet stream flows north to the Trout River.

The shoreline is primarily upland, forested with second-growth dry-mesic forest of paper birch, bigtooth aspen, and red maple. White and red pine are dominant locally. Small stands of boggy wetlands are present along portions of the lakeshore.

To the northeast of the lake is a forested drumlin supporting a second-growth stand of medium-size red oak. Associates are paper birch, red maple, and bigtooth aspen, with an occasional white or red pine. The site was probably pine-dominated historically, but some of the oaks appeared to originate as stump sprouts, so it's likely that oak has been an important component of this forest here for a long time.

A small, unnamed, undeveloped seepage lake occupies a hollow between the "drumlin" and East Ellerson Lake.

Site Significance

Large undeveloped lakes are scarce and becoming increasingly so. East Ellerson is an excellent, apparently undisturbed example of a lake type that is commoner in the Northern Highland landscape than anywhere else in the state.

The forested drumlin is a good site at which to focus on either oak management or pine restoration.

Several rare animals are documented residents at this.

Management Considerations

Maintaining the hydrology and water quality is essential to protect the important features of this site. Several outstanding aquatic features, all representing very different lake and stream types, are in close proximity: East Ellerson Lake; Camp Lake; Devine Lake; and the Trout River. Though the uplands between these waterbodies are and have been intensively managed (mostly for aspen), it is worth weighing the additional ecological benefits that might be derived from considering the lakes collectively. Forest management that would promote longer-lived species (oak and pine) is an appropriate consideration for this site. Relatively few sites were identified that offer short-term potential for protection and management of older oak forest.

EAST ELLERSON LAKE AND DRUMLIN			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
LAKE--DEEP, VERY SOFT, SEEPAGE		NA	1992
NORTHERN DRY-MESIC FOREST		NA	1995
ANIMALS			
A CAENID MAYFLY (CAENIS YOUNGI)		SC/N	1994
CYRANO DARNER (NASIAESCHNA PENTACANTHA)		SC/N	1994

43. SPARKLING CREEK CEDARS

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Boulder Junction
Town-Range-Section: T41N-R6E-sec. 27 NE1/4
Size: 65 acres

Site Description

Sparkling Creek is a tiny, spring-fed tributary of the Trout River that originates in and drains a forested wetland composed mostly of northern white cedar, and locally, black ash. Canopy associates include black spruce, paper birch, and an occasional hemlock or white spruce. The canopy is quite open, and the gaps are typically filled with dense thickets of tall shrubs, especially speckled alder and red-osier dogwood. Many small pools are present.

The uplands around the swamp forest are intensively managed for aspen.

Site Significance

The swamp forest is not in good condition owing to past and present disturbances, but it is important as it feeds the Trout River, a stream of very high ecological significance. Sparkling Creek Cedars also supports several rare plant and animal species.

Management Considerations

Many of the trees in the center of the swamp are dead or stressed, apparently due to inundation caused by the presence of beaver dams on the creek. Deer browse is very heavy on species such as mountain maple, dogwoods, and ash saplings, and white cedar is not successfully reproducing beyond the seedling stage. Sites containing features of greater ecological significance occur just to the north, south, and west.

SPARKLING CREEK CEDARS			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
NORTHERN WET-MESIC FOREST		NA	1994
ANIMALS			
BLACK-BACKED WOODPECKER (PICOIDES ARCTICUS)		SC/M	1992
BOREAL CHICKADEE (POECILE HUDSONICUS)		SC/M	1992
PLANTS			
NORTHERN BOG SEDGE (CAREX GYNOCRATES)		SC	1992

44. CAMP LAKE AND PINES

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Woodruff, Boulder Junction
Town-Range-Section: T41N-R6E-secs. 27 S1/2, 26 SW1/4SW1/4
Size: 258 acres

Site Description

This site features two glacial kettle lakes separated by a narrow isthmus forested with large white and red pines. The pine forest, though small in extent, is mature and shows little evidence of recent disturbance. Old-growth structural characteristics are beginning to appear.

Camp Lake is a deep seepage lake with extremely soft, clear water and a sand and gravel bottom. The flora includes a number of plants which have special adaptations to the highly oligotrophic conditions. Both the lake type and the unusual flora associated with it are better represented in this ecoregion than elsewhere in the state. Camp Lake is entirely bordered by a forested upland shoreline.

Just to the east is a small unnamed lake. This waterbody is also a seepage lake, but shallow and with a muck bottom. Acid, semi-open peatlands of muskeg and open bog surround this lake.

Site Significance

The lakes and wetlands are undisturbed and are excellent representatives of common types in the Northern Highland landscape. The dry-mesic pine forest community, while small, is mature and developing the characteristics of an old-growth stand. These characteristics are currently very rare for this forest type throughout northern Wisconsin. The close proximity of two strongly contrasting waterbodies affords an unusual opportunity for certain types of protection, research and education.

The lakes support several rare plant species, and the adjacent forest provides habitat for rare birds.

Management Considerations

Camp Lake and Pines should be considered for strong protective designation to protect the site from future development and potentially adverse impacts to water quality and sensitive species. Management activities should eliminate or minimize negative impacts to water quality, natural communities, and rare species populations located here.

Camp Lake, with its ultra-soft water, is highly vulnerable to acidification if regional air quality was to deteriorate.

Managing to increase both the amount and the age of pines and other conifers in the forest surrounding the site is a worthwhile consideration. The small stand of existing older forest between the lakes may eventually require intervention of some sort to ensure its perpetuation. Diversifying tree composition in the immediate vicinity of the lakes (primarily aspen) would help assure the continuation of the pine-dominated community should it be subject to a severe disturbance event.

CAMP LAKE AND PINES			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
LAKE--DEEP, VERY SOFT, SEEPAGE		NA	1993
NORTHERN DRY-MESIC FOREST		NA	1993
PLANTS			
HIDDEN-FRUITED BLADDERWORT (UTRICULARIA GEMINISCAPA)		SC	1994
NORTHEASTERN BLADDERWORT (UTRICULARIA RESUPINATA)		SC	1994

45. DEVINE LAKE - MISHONOGAN CREEK

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Woodruff
Town-Range-Section: T40N-R6E-secs. 3 W1/2NW1/4, 4 N1/2NE1/4
T41N-R6E-secs. 33 SE1/4SE1/4, 34 S1/2SW1/4, SW1/4SE1/4
Size: 1,453 acres

Site Description

This shallow undeveloped lake is fed by numerous alkaline springs. The springs flow through a diverse mosaic of herbaceous, shrub, and forested wetlands which fill the basin around the lake and are especially prominent on the north and east sides. The flora of this wetland complex is exceptional.

Mishonogan Creek, the lake's outlet stream, is bordered by alder thicket, muskeg, small stands of white cedar, and patches of boggy black spruce-tamarack swamp. The invertebrate life of this stream is significant in its diversity and representativeness.

A small island in the lake is forested with second-growth dry-mesic hardwoods (paper birch, red maple), plus white pine and balsam fir. Aspen dominates the rolling uplands around the site, though there is some potential to manage for greater forest diversity because of the presence of remnant conifers (fir, white and red pine, white spruce).

Site Significance

This site a unique complex of alkaline spring lakes and associated wetlands that are especially rare in this ecoregion. The opportunity to protect a significant portion of the undeveloped outlet stream is also unusual.

This site supports many rare species, some of them represented by large populations. The critical habitats include both open and forested wetlands, shrub swamp, springs, and the lake's outlet stream.

Management Considerations

This site should be considered for strong protective designation with an emphasis on protecting site hydrology and water quality. The impacts on this site from clearcutting throughout the watershed are unknown at this time. All upland management actions should be evaluated to determine the impacts to the rare springs and associated wetlands.

Two other important sites featuring aquatic communities occur approximately 1 mile to the north. Options to manage for longer-lived species, especially conifers, in the vicinity of and between these sites, merit thorough exploration.

DEVINE LAKE - MISHONOGAN CREEK			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
NORTHERN SEDGE MEADOW		NA	1993
NORTHERN WET FOREST		NA	1993
SPRING LAKE		NA	1995
ANIMALS			
AMERICAN BITTERN (BOTHAURUS LENTIGINOSUS)		SC/M	1993
AMERICAN BLACK DUCK (ANAS RUBRIPES)		SC/M	1993
BOG COPPER (LYCAENA EPIXANTHE)		SC/N	1995
BOREAL CHICKADEE (POECILE HUDSONICUS)		SC/M	1993
EVENING GROSBEAK (COCCOTHAUSTES VESPERTINUS)		SC/M	1993
LE CONTE'S SPARROW (AMMODRAMUS LECONTEII)		SC/M	1993
OSPREY (PANDION HALIAETUS)		THR	1992
YELLOW-BELLIED FLYCATCHER (EMPIDONAX FLAVIVENTRIS)		SC/M	1993
ZEBRA CLUBTAIL (STYLURUS SCUDDERI)		SC/N	1994
PLANTS			
COMMON BOG ARROW-GRASS (TRIGLOCHIN MARITIMUM)		SC	1995
LEAFY WHITE ORCHIS (PLATANATHERA DILATATA)		SC	1995
MARSH WILLOW-HERB (EPILOBIUM PALUSTRE)		SC	1995
SHEATHED SEDGE (CAREX VAGINATA)		SC	1993
SPARSE-FLOWERED SEDGE (CAREX TENUIFLORA)		SC	1993
SWAMP PINK (ARETHUSA BULBOSA)		SC	1995

46. BLACK TERN BOG

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Woodruff
Town-Range-Section: T40N-R6E-sec. 12 NE1/4NE1/4
Size: 28 acres

Site Description

This glacial kettle depression contains two small ponds bordered by a quaking mat of sphagnum mosses, sedges, and ericaceous shrubs. The rich flora includes insectivorous species, orchids, and at least three rare plants. The water chemistry, and the composition and structure of the vegetation, indicate that this wetland community is more appropriately classified as a poor fen than a bog.

One rare invertebrate has been documented at the site. A colony of black terns was present until the mid-1980s, but that species has not bred here since then.

The uplands surrounding the complex are forested with nondescript stands of second or third growth aspen and paper birch.

Site Significance

Black Tern Bog was established as a State Natural Area in 1967. Along with several of the other SNAs in the vicinity, it has been used extensively as a teaching and research site by University of Wisconsin botanists and plant ecologists. Though small, the site contains a very good example of a glacial kettle wetland with better than average plant diversity.

Management Considerations

Conservation values at this site are somewhat compromised by small stand size and the immediate proximity of heavily-used US Highway 51. Protection of the water chemistry and hydrology are high priorities and efforts need to be made to ensure that transportation planners and road maintenance crews are aware of the ecological value and sensitivity of these wetlands. Continued use as an educational site is appropriate here.

BLACK TERN BOG			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
POOR FEN		NA	1995
ANIMALS			
A CADDISFLY (BANKSIOLA DOSSURIA)		SC/N	1983
BLACK TERN (CHLIDONIAS NIGER)		SC/M	1978
PLANTS			
HIDDEN-FRUITED BLADDERWORT (UTRICULARIA GEMINISCAPA)		SC	1995
ROBBINS SPIKERUSH (ELEOCHARIS ROBBINSII)		SC	1995
SWAMP PINK (ARETHUSA BULBOSA)		SC	1972

47. VANDERCOOK LAKE AND PINES

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Woodruff
Town-Range-Section: T41N-R6E-sec. 36 SE1/4, SE1/4NE1/4; T41N-R7E-sec. 31 SW1/4
Size: 119 acres

Site Description

Rolling sands north of Vandercook Lake support a mature forest of large white and red pines. Associates include red and sugar maples, red oak, and balsam fir. White pine seedlings and small saplings are locally common, but in general, hardwood and fir reproduction is prevalent. This site has a variable cutting history, with no recent activity in the best-developed patches. The surrounding forest is younger, composed mostly of pole-size red maple and paper birch, with scattered red oak and white pine.

The south half of the lake is ringed with dwellings. The lake was stocked once in the past.

Site Significance

Historically the most widespread forest type in this landscape, mature stands of white and red pine are now much less extensive and almost always composed of relatively young trees.

Management Considerations

This site could serve as an appropriate nucleus for pinery restoration in the adjoining forest, especially to the east and south. Pine should be emphasized and featured when making future management decisions. Establishment of an old-growth core area would maintain or permit the development of a limited successional stage and to maintain or increase four-toed salamander habitat. Protection of this site will maintain the potentially largest four-toed salamander preserve in the Great Lakes region.

VANDERCOOK LAKE AND PINES			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
NORTHERN DRY-MESIC FOREST		NA	1994
ANIMALS			
FOUR-TOED SALAMANDER (HEMIDACTYLIUM SCUTATUM)		SC/N	1996
PLANTS			
NORTHEASTERN BLADDERWORT (UTRICULARIA RESUPINATA)		SC	1976
SHORE SEDGE (CAREX LENTICULARIS)		THR	1995

48. MANN CREEK PINES

Ecoregion: Northern Highland Pitted Outwash
USGS 7.5' Quadrangle: Boulder Junction
Town-Range-Section: T41N-R7E-sec. 30 SW1/4
Size: 17 acres

Site Description

The uplands just east of Mann Creek support a mature dry-mesic forest dominated by large to medium-size red pine. Among the canopy associates are white pine, red oak, and paper birch. Balsam fir is abundant in the sapling layer. Typical understory plants include bracken fern, blueberries, wintergreen, and barrens strawberry.

Mann Creek is impounded, creating a small flowage bordered by small patches of emergent marsh and sedge meadow, and more extensive stands of muskeg and black spruce swamp.

Site Significance

Mature, intact stands of pine-dominated dry-mesic forest are uncommon on the NHAL at the present time.

Management Considerations

The major conservation limitations of this site are the small acreage of upland forest present and its location next to a heavily used county highway. In addition, the pine forest was at least partially thinned recently, somewhat reducing its natural values.

MANN CREEK PINES			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
NORTHERN DRY-MESIC FOREST		NA	1994
ANIMALS			
WATER SHREW (SOREX PALUSTRIS)		SC/N	1946

49. TROUT LAKE CONIFER SWAMP

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Boulder Junction
Town-Range-Section: T41N-R7E-sec. 19 SE1/4SE1/4
Size: 26 acres

Site Description

This site consists of a small, steep-sided wet depression located at the southeastern corner of Trout Lake. The major plant community is a mature wet-mesic forest dominated by medium-size white cedar, with balsam fir and black ash among the important associates. Cedar reproduction is currently poor. The herbaceous flora is diverse, and includes a rich array of mosses, sedges, orchids, and other plants.

The resident birds include a representative subset of the species typically found in the regional lowland conifer forests during the breeding season. One rare invertebrate is known from this site.

The adjoining uplands are vegetated with second-growth stands of dry-mesic forest composed of bigtooth aspen, paper birch, red oak, red maple, and balsam fir.

The site is crossed by an old, abandoned railroad grade. Several homes are located on the nearby shore of Trout Lake. County highways "M" and "N" are just to the east and south of the site, respectively.

Site Significance

Trout Lake Conifer Swamp was established as a State Natural Area in 1953 and has a long history of use by University of Wisconsin plant ecology and botany classes. The UW maintains a research and teaching facility on the south shore of Trout Lake, just to the west of the site.

Cedar swamps are uncommon in this ecoregion and this site contains a good, albeit small, example.

Management Considerations

The major conservation limitations of this site are its small size, isolation, and vulnerability to excessive browse. Despite these shortcomings, the site does contain a floristically rich cedar swamp, and is well suited for its intended educational use. No changes from the present situation are suggested but the browse sensitivity of white cedar should be considered when making management decisions for the adjacent upland forests.

TROUT LAKE CONIFER SWAMP			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
NORTHERN WET-MESIC FOREST		NA	1991

50. TROUT LAKE PINES

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Boulder Junction
Town-Range-Section: T41 N-R7E-secs. 7, 8
Size: 67 acres

Site Description

A remnant stand of very old, huge white and red pines occurs on the south side of Trout Point, a mile long peninsula on the east side of Trout Lake that partially separates that lake into two major basins. Associates include red oak and red maple, the latter being dominant in the sapling stratum. A dense layer of beaked hazelnut is prominent, especially on the flat top of the peninsula. The old-growth stand occupies a very narrow strip, often less than 100' wide, and is bordered by a second-growth hardwood-dominated forest on the north, pine plantations on the east, and Trout Lake to the south and west.

An extensive undeveloped sand beach runs along the south edge of the point. UW-Madison plant ecologist John Curtis and his colleagues studied the beach a half century ago. The data collected contributed to the section on "inland" (i.e., not on the Great Lakes) beaches and were incorporated into his seminal work, "Vegetation of Wisconsin" (1959). The beach and adjoining offshore area are of additional scientific interest and value because they support an invertebrate fauna containing many species more characteristic of "lotic" (flowing) habitats.

Site Significance

Stands of the dry-mesic forest community in or approaching old-growth successional stages are extremely rare in the present-day forest. The conservation values of the pine forest are limited because of small size and linear configuration. The natural composition and structure of the forest have been altered by past cutting, the long-term suppression of wildfire, and recreational use.

At least two rare animal species are resident at this site (NHI field notes, 1992).

Management Considerations

Aesthetics may be a greater concern here than pine forest ecology, as the site is small and isolated and receives fairly heavy use by visitors. Trout Lake is well known for its scenic qualities. Eventually, the impacts of fire suppression may necessitate evaluating the difficulties inherent in maintaining pine communities on certain sites using silvicultural methods alone.

The beach and adjacent littoral zone would benefit from continued or expanded protection. Note that on the site map, the boundary does not extend far enough to the east to encompass the entire beach.

TROUT LAKE PINES			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
NORTHERN DRY-MESIC FOREST		NA	1992

51. HEMLOCK LAKE

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Hazelhurst, Woodruff
Town-Range-Section: T39N-R7E-secs. 7, 8, 17, 18.
Size: 473 acres

Site Description

This site is 2 miles southeast of Woodruff, just off of STH 47. The natural features include stands of older mesic hemlock-hardwoods, dry-mesic white pine-red pine forest, several wetland communities, and four small, undeveloped seepage lakes. Hemlock Lake has been stocked at least seven times in the past.

Site Significance

Older forests, especially conifer-dominated stands, are relatively rare in the NHAL and the surrounding region today. Several rare animals inhabit the site and at least two rare plants occur in Hemlock Lake.

Management Considerations

A forested portion of the site adjoining both sides of STH 47 suffered heavy wind damage recently and has been salvaged (logged). Additional logging has been proposed for undamaged but mature stands of natural pine forest along and just west of STH 47 (see **Timberlane Pines #52**). Contextually, it is desirable to maintain and enhance stands of older conifer-dominated forest to meet the habitat needs or preferences of species dependent on these covertypes while accommodating natural disturbance events. The existing road system, however, along with other development, limit the conservation opportunities at both Hemlock Lake and Timberland Pines.

Future stocking of the lake should be carefully reviewed for impact to the aquatic community.

A trail system accommodates educational and recreational use of the site by hikers and cross-country skiers.

HEMLOCK LAKE			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
NORTHERN MESIC FOREST		NA	1997
ANIMALS			
BALD EAGLE (HALIAEETUS LEUCOCEPHALUS)	LTNL	SC/FL	1976
OSPREY (PANDION HALIAETUS)		THR	1992
PLANTS			
PURPLE BLADDERWORT (UTRICULARIA PURPUREA)		SC	1995
ROBBINS SPIKERUSH (ELEOCHARIS ROBBINSII)		SC	1995

52. TIMBERLANE PINES

Ecoregion: Northern Highland Pitted Outwash
USGS 7.5' Quadrangle: Hazelhurst
Town-Range-Section: T39N-R7E-sec.18
Size: 144 acres

Site Description

A mature dry-mesic forest dominated by large white and red pines occupies a good portion of a sandy, gently rolling peninsula between Mid and Minocqua Lakes. Associated trees include red maple, red oak, bigtooth aspen, black cherry, and paper birch. Balsam fir saplings are common throughout the site, with sapling white pine locally prevalent in canopy gaps. The groundlayer consists of beaked hazelnut, bracken fern, blueberries, wintergreen, barrens strawberry and others. The stand south of Timberlane Road and west of state highway 47 is intact. To the north of Timberlane Road, heavy salvage logging occurred following severe damage caused by a recent windstorm.

Site Significance

Mature, conifer-dominated stands of this forest community, once the most characteristic type of this ecoregion, are presently uncommon. Old-growth stands are almost nonexistent. This property has a key role to play in the representation of all successional stages and appropriate patch sizes of dry-mesic white and red pine forest in Wisconsin.

Management Considerations

Small stand size and isolation are the major factors limiting the ecological value of this site. Nevertheless, the site should be considered for some protective designation because of the high importance of this community in the Northern Highlands landscape and the overall good quality of the remnant pine forest.

TIMBERLANE PINES			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
NORTHERN DRY-MESIC FOREST		NA	1994
OPEN BOG		NA	1982

53. ZOTTLE LAKE

Ecoregion: Northern Highland Pitted Outwash
USGS 7.5' Quadrangle: Lake Tomahawk
Town-Range-Section: T39N-R7E-sec. 34
Size: 44 acres

Site Description

This 30 acre, 38 feet deep, soft water seepage lake has clear alkaline water and a firm sand bottom. In some areas there is a thin layer of organic material overlying the sand. The aquatic flora consists mostly of highly specialized species from the “sterile rosette” group, such as water lobelia, pipewort, quillwort, and the rush, *Juncus pelocarpus*.

The shoreline is almost entirely upland, and the second –growth forest around the lake is mostly of hardwoods, with paper birch dominant.

Site Significance

This site contains a good example of one of the important lake types (a highly oligotrophic seepage lake with a hard bottom) in this ecoregion.

Management Considerations

Protection should be relatively easy as state ownership encompasses the entire shoreline. Present use levels do not appear to be causing problems, but water quality must be protected to maintain the rare community. Lakes of this type are vulnerable to acidification if regional air quality declines.

ZOTTLE LAKE			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
LAKE--DEEP, VERY SOFT, SEEPAGE		NA	1993

54. TOMAHAWK LAKE HEMLOCKS

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Lake Tomahawk, Hazelhurst
Town-Range-Section: T38N-R7E-sec. 4 NW1/4, NE1/4SW1/4
Size: 220 acres

Site Description

This site encompasses an upland peninsula on the southeast side of Tomahawk Lake. A diverse representation of older mesic forest is present. The cover types represented include hemlock, mixed hemlock-hardwoods, and hardwood stands composed mostly of yellow birch, sugar maple, and red oak. A few supercanopy white pine are present, and white pine saplings are common on a steep southwest-facing slope under paper birch-sugar maple pole timber. Hemlock reproduction is excellent at several locations within this site.

Other features at this site include small stands of open bog and black spruce swamp, a bog pond (small, deep, soft water), and approximately one mile of undeveloped lake shoreline.

Site Significance

Evidence of past logging was evident throughout the site, but recent harvest has been minimal. There is a high potential to do significant research on hemlock reproduction here, if the forest management and disturbance history can be worked out in sufficient detail. Protection of this site warrants serious consideration, as older stands of mesic forest, particularly those in which hemlock is successfully reproducing, are rare in this part of the Northern Highland.

Management Considerations

State ownership here is limited and protection of the natural communities and lake shoreline will require cooperation among the various landowners and stakeholders.

TOMAHAWK LAKE HEMLOCKS			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
NORTHERN MESIC FOREST		NA	1992

55. HORSEHEAD LAKE PINE-OAK FOREST

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Lake Tomahawk
Town-Range-Section: T38N-R7E-secs. 11, 10
Size: 226 acres

Site Description

The pitted glacial outwash landform supports second-growth dry-mesic forest of white and red pines, red oak, red maple, and paper birch. Parts of this site are forested with relatively pure stands of pole-size hardwoods. The robust shrub layer is composed of hazelnuts and maple-leaved viburnum. White pine is reproducing well locally.

Site Significance

This forest type was historically prevalent over a large portion of this ecoregion. Presently, stands dominated by large pines are scattered throughout the state forest, often separated by other covertypes or plantations. Acreages of the pine remnants are typically small.

The herb layer is relatively diverse for this forest type, containing some "southern" elements as well as the species more characteristic of this region.

Management Considerations

This site is isolated, with roads on three sides and a lake on the fourth. This poses limitations for strong protective status. Extended rotations and an increased pine component would help maintain and expand the northern dry-mesic communities here.

HORSEHEAD LAKE PINE-OAK FOREST			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
NORTHERN DRY-MESIC FOREST		NA	1998
ANIMALS			
CERULEAN WARBLER (DENDROICA CERULEA)		THR	1992
EVENING GROSBEAK (COCCOTHRAUSTES VESPERTINUS)		SC/M	1992

56. TWO LAKES PINE-OAK FOREST

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Lake Tomahawk
Town-Range-Section: T38N-R7E-secs. 16, 15
Size: 181 acres

Site Description

Gently rolling, sandy terrain bordered by three kettle lakes is forested with mature stands of white and red pines and red oak. The oldest, least disturbed stands are developing old-growth structural characteristics, including a supercanopy of very large pines. In most areas tree reproduction is strongest by red and sugar maples, and balsam fir, but locally, sapling white pine are common. The moderate to dense shrub layer is composed of beaked hazel and maple-leaved viburnum. Blueberries, bracken fern, wintergreen, wild sarsaparilla, and rice grass are common herbs/low shrubs throughout the site.

Within this site there are small stands of mature mesic forest composed of large hemlock, yellow birch, basswood, and sugar maple, as well as several boggy kettle wetlands.

Site Significance

Older successional stands of the formerly prevalent white pine-red pine forest community are now rare throughout Wisconsin.

Management Considerations

The site is not large, and private lands on and near the lakeshores continue to be developed. Management options are somewhat limited as the site is becoming increasingly isolated.

TWO LAKES PINE-OAK FOREST			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
NORTHERN DRY-MESIC FOREST		NA	1998

57. WIND PUDDING LAKE

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Hazelhurst, Lake Tomahawk
Town-Range-Section: T38N-R7E-secs. 20, 21, 28,29
Size: 410 acres

Site Description

This large, softwater seepage lake contains several basins, each with distinctive characteristics. The shallow, muck-bottomed areas support dense growths of aquatic vegetation, which in turn support rare plant and animal life. The southeastern basin is deep, with sand and gravel the predominant bottom materials. A well-developed "sterile rosette" flora occurs here, with several of these plants either rare or quite restricted in range in Wisconsin. Wind Pudding Lake has been stocked at least eight times.

A good representation of waterbirds (both residents and migrants) was noted.

The uplands are forested with second and third growth stands of aspen, paper birch, and red oak. A few scattered red and white pines are present. The rough pitted outwash terrain is pocked with deep, steep-sided depressions, several of which contain small ponds (at least periodically).

The westernmost basin is developed with several homes on and near the shoreline.

Site Significance

The lake is a designated State Natural Area, and was initially recommended for special protection because of its high quality wetland communities, unusual flora, and rare species.

Management Considerations

This site should maintain its strong protective designation. However, there have been past attempts to dredge a channel to connect the west basin with the remainder of the lake. This activity should be prohibited to protect the eastern portion of the lake containing intact stands of sensitive wetland vegetation, and supporting a number of rare species. Minimizing future development would help to maintain the important natural communities of this site.

Future stocking of the lake should be carefully reviewed for impact to the aquatic community. Damage to the beds of aquatic vegetation is likely if the use of motorized watercraft were to increase. There is also the possibility of introducing invasive species to the site.

There is a 400 feet no-cut zone around that part of the lake with protective designation. However, much of the upland beyond this zone has been recently logged. A portion of the no-cut zone was cut, in a salvage operation following windstorm damage in the mid-1980s.

WIND PUDDING LAKE			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
LAKE--DEEP, VERY SOFT, SEEPAGE		NA	1995
NORTHERN DRY-MESIC FOREST		NA	1979

WIND PUDDING LAKE			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
ANIMALS			
MOTTLED DARNER (AESHNA CLEPSYDRA)		SC/N	1994
PLANTS			
FARWELL'S WATER-MILFOIL (MYRIOPHYLLUM FARWELLII)		SC	1994
HIDDEN-FRUITED BLADDERWORT (UTRICULARIA GEMINISCAPA)		SC	1994
PURPLE BLADDERWORT (UTRICULARIA PURPUREA)		SC	1995
ROBBINS SPIKERUSH (ELEOCHARIS ROBBINSII)		SC	1978

58. HAWK LAKE

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Lake Tomahawk
Town-Range-Section: T38N-R7E-sec.23
Size: 19 acres

Site Description

Hawk Lake is a 10 acre kettle bog situated in pitted glacial outwash. A small bay on the northwest side of the lake features an undisturbed but very narrow open mat of sphagnum mosses, ericaceous shrubs, sedges, and insectivorous plants. Away from the lake shore the open mat grades into a muskeg and acid conifer swamp with black spruce and tamarack prominent. Much of the shoreline is upland.

The uplands are forested with second-growth, managed stands of white and red pines, red oak, red maple and paper birch.

Site Significance

The site contains a small but representative example of a widespread northern Wisconsin wetland community. At least one rare plant species occurs here.

Management Considerations

No special management should be necessary to afford the wetlands an adequate level of protection. The compartment reconnaissance indicates a relatively high concentration of pine in the vicinity of Hawk Lake, though aspen stands and pine plantations break up the natural pine forest somewhat. Additional survey work in the uplands is desirable here.

HAWK LAKE			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
OPEN BOG		NA	1996
PLANTS			
SWAMP PINK (ARETHUSA BULBOSA)		SC	1996

59. MCNAUGHTON CONIFER SWAMP

Ecoregion: Northern Highlands Pitted outwash
USGS 7.5' Quadrangle: McNaughton Conifer Swamp
Town-Range-Section: T38N-R7E-secs. 25, 36; T38N-R7E-sec. 31
T37N-R7E-sec. 1; T37N-R8E-sec. 6
Size: 409 acres

Site Description

McNaughton Swamp contains a large bog forest dominated by black spruce, with tamarack as the major canopy associate. Minor associates include white cedar, black ash, balsam fir, red maple, and paper birch. The understory in the undisturbed interior areas is composed mostly of ericaceous shrubs and sedges over sphagnum mosses. The Wisconsin River is just to the east of the site.

Boreal animals such as Gray Jay and Boreal Chickadee are resident here, and further investigation would likely identify others from this group.

The site is bisected by STH 47, a busy thoroughfare connecting Rhinelander with Woodruff-Minocqua. An abandoned railroad right-of-way also crosses the site. There have been some apparent changes to site hydrology, with minor ponding on the up slope sides of these corridors, and diversion of water away from the down slope sides. Given that the wetlands here are still, for the most part, intact, it would be useful to monitor further changes in the vegetation.

Site Significance

This site contains one of the larger, potentially more viable, stands of black spruce forest in the region. The primary conservation drawbacks are the impacts of several major rights-of-way on site hydrology, the fragmentation caused by those rights-of-way, and the relatively complex ownership pattern. A relatively small portion of this site is within the state forest boundary.

Management Considerations

Given the complex ownership pattern of this site, an integrated management plan would provide needed additional field survey, a more thorough regional analysis, and more effective protection to the important natural resources existing here. Current management of the state-owned portion of the site should continue to protect the area from any additional adverse impacts.

MCNAUGHTON CONIFER SWAMP			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
NORTHERN WET FOREST		NA	1993
ANIMALS			
BOREAL CHICKADEE (POECILE HUDSONICUS)		SC/M	1993
GRAY JAY (PERISOREUS CANADENSIS)		SC/M	1992

60. RAINBOW WETLANDS

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Dam Lake, Lake Tomahawk
Town-Range-Section: T39N-R8E-secs. 21, 22, 27, 28
Size: 2,536 acres

Site Description

South and east of the Rainbow Flowage, an impounded stretch of the Wisconsin River, there is a large peatland of sedge meadow, shrub swamp, open bog, and muskeg. Low sandy ridges and "islands" within this wetland support a dry forest composed mostly of jack and red pines.

The wetlands closest to the flowage are floristically rich and comprise a complicated mosaic of shrub thicket (willows, bog birch, alder) and sedge-dominated openings. The flora includes a number of species that were seldom (in a few cases, never) encountered in other northcentral Wisconsin wetlands.

To the northeast, the wetland is more acidic, composed mostly of bog species, with a thick base of sphagnum mosses providing the substrate upon which sedges, ericaceous shrubs, and stunted black spruce and tamarack grow. Unusually large populations of rush aster and bog goldenrod were noted. A small, deep seepage lake with very soft water and a muck bottom is present on the southeast edge of the site.

The nearly level sandy uplands bordering the site are forested with pines and aspen. Some of the pine is plantation grown, but there are some good quality, though small, natural stands of pine on the narrow sand ridges within the bog-meadow complex.

Site Significance

This site contains one of the largest peatlands on the State Forest. The diverse community mosaic includes uncommon as well as representative types, and the flora follows suit. Additional protection for peatlands is warranted beyond what has been extended to them thus far in this ecoregion.

Several rare species were documented here.

Management Considerations

This site should be considered for strong protective designation. Protection of site hydrology and water quality are key to maintaining the important communities and rare species at this site. The impacts of fluctuating water levels on the site's natural communities are unknown but should receive additional study. Management of the flowage does not appear to have affected the interior of the wetland and negative impacts to the western fringe have not been identified. Periodic wetland monitoring would identify the presence of invasive species.

Though peatland protection deserves emphasis here, the uplands do present an opportunity to manage and/or restore xeric conifer forests. The many waterbodies and wetlands in the local landscape, and their ability to serve as fire breaks, potentially increase the feasibility of fire management.

RAINBOW WETLANDS			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
NORTHERN DRY FOREST		NA	1993
NORTHERN SEDGE MEADOW		NA	1993
OPEN BOG		NA	1993
ANIMALS			
BALD EAGLE (HALIAEETUS LEUCOCEPHALUS)	LTNL	SC/FL	1992
NORTHERN HARRIER (CIRCUS CYANEUS)		SC/M	1993
OSPREY (PANDION HALIAETUS)		THR	1992
PLANTS			
MARSH WILLOW-HERB (EPILOBIUM PALUSTRE)		SC	1995
SHEATHED SEDGE (CAREX VAGINATA)		SC	1995

61. BIG SWAMP

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Dam Lake
Town-Range-Section: T39N-R8E-portions of secs. 34-36; T38N-R8E-portions of secs. 1-3, 10-13; T38N-R9E-portions of secs. 6, 7.
Size: 4,592 acres

Site Description

This vast peatland complex harbors extensive stands of muskeg, open bog, poor fen and sedge meadow and an undeveloped seepage lake. Small but significant stands of mature white and red pine forest are also present. Thickets of alder-dominated shrub swamp occur along the wetland margins.

Site Significance

Acid peatlands are common and extensive in the Northern Highlands ecoregion. Big Swamp is one of the largest and least disturbed examples on the State Forest, and should be capable of supporting viable populations of most if not all of the resident plants and animals. The diverse natural community mosaic encompasses wetlands, uplands, and aquatic features and constitutes an excellent example of a representative Northern Highlands Pitted Outwash landscape.

Several rare plant and animal species have been documented here (some species not included in the site table-see page B-1).

Management Considerations

This site should be considered for strong protective designation. Wetlands in the northernmost portions of the site have been destroyed or altered by commercial developments. Future monitoring would identify any related future adverse impacts. Merging this site with the next (Swanson Lake and Pines) should be considered for management purposes. They adjoin one another and there are ecological benefits to be achieved due to the addition of species (some of them rare) and natural communities, and the increase in scale.

BIG SWAMP			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
NORTHERN SEDGE MEADOW		NA	1982
OPEN BOG		NA	1993
PLANTS			
SWAMP PINK (ARETHUSA BULBOSA)		SC	1993

62. SWANSON LAKE AND PINES

Ecoregion: Northern Highlands Pitted outwash
USGS 7.5' Quadrangle: Dam Lake
Town-Range-Section: T38N-R8E-secs. 3, 4 E1/4.
Size: 504 acres

Site Description

This site includes 3 softwater seepage lakes, muskeg, alder thicket, and dry-mesic forest of pine and oak.

The lakes are small (22, 10, and 1.4 acres), undeveloped, and support unusual aquatic life. The wetlands are of the acid peatland group, and include bog forest of black spruce and tamarack, semi-open muskeg to the north of Swanson Lake, and alder thicket along Muskellunge Creek, the site's eastern boundary.

The dry-mesic forest is second-growth but mature, composed of large to medium-size red pine, red oak, paper birch, red maple and white pine. Tree reproduction is primarily by red maple, with white pine and balsam fir saplings also noted. The moderately dense shrub layer consists mostly of beaked hazelnut. Adjoining upland stands have been clear-cut and are dominated by aspen.

Site Significance

This site contains one of the American Legion's better second-growth pine forests in that this site, unlike most others in this part of the NHAL, is less isolated by roads, plantations, residences, checkerboard ownership, or other factors. The immediate context of the upland forest includes extensive undisturbed wetlands of several types and highly significant aquatic features, which are additional benefits.

The lake supports several rare plant species.

Management Considerations

This site should be considered for strong protective designation. Because of the remote location and prevalence of wetlands at this site, management of the pine-oak forest with prescribed fire may be feasible and practical. However, until such management prescriptions are possible, the entire site, including the uplands, should be protected. The area of consideration should include Big Swamp, a vast, important peatland just to the east of Swanson Lake and Muskellunge Creek.

Managing the existing aspen stands towards greater representation of long-lived species (such as red and white pines and red oak) would provide a larger, more viable block of this forest community. Aspen is abundant throughout this landscape and mature pine-oak forest is now relatively uncommon.

SWANSON LAKE AND PINES			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
LAKE--DEEP, VERY SOFT, SEEPAGE		NA	1993
LAKE--SHALLOW, SOFT, SEEPAGE		NA	1995
NORTHERN DRY-MESIC FOREST		NA	1993

SWANSON LAKE AND PINES			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
PLANTS			
ALGAE-LIKE PONDWEED (POTAMOGETON CONFERVOIDES)		THR	1995
FARWELL'S WATER-MILFOIL (MYRIOPHYLLUM FARWELLII)		SC	1995
HIDDEN-FRUITED BLADDERWORT (UTRICULARIA GEMINISCAPA)		SC	1995
PURPLE BLADDERWORT (UTRICULARIA PURPUREA)		SC	1995

63. PICKEREL LAKE

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Dam Lake
Town-Range-Section: T38N-R8E-sec. 13
Size: 206 acres

Site Description

This site contains an undeveloped 59 acre drainage lake, several wetland communities, and a small stand of dry-mesic red and white pine forest. The lake's maximum depth is 5 feet, the bottom materials are primarily muck and sand, and the soft, light brown water has low transparency. Aquatic vegetation is moderate in density, and includes emergent, submergent, and floating-leaved species. Representative among these are watershield, white water lily, spikerushes, bur-reeds, and several pondweeds. Indian Creek, a small headwaters stream, enters the southeast side of Pickerel Lake and exits on the northeast. Above Pickerel Lake, Indian Creek was not navigable at the time of our field survey.

The wetlands bordering the lake include sedge meadow, shrub swamp, and boggy, semi-open stands of black spruce and tamarack. These communities are essentially undisturbed but they are not extensive. The mature pine forest east of the lake is very small but has not been cut recently.

Site Significance

Development pressures are extremely high on lakes in northcentral Wisconsin. This site contains a very good example of a regionally representative but threatened aquatic ecosystem.

Management Considerations

The site is vulnerable to incompatible developments since some of the shoreline around Pickerel Lake is privately owned. Various options should be explored to protect this aquatic community.

PICKEREL LAKE			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
LAKE--SHALLOW, SOFT, DRAINAGE		NA	1994

64. SHALLOW LAKE

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Dam Lake
Town-Range-Section: T38N-R8E-secs. 22, 15.
Size: 128 acres

Site Description

This small, undeveloped, muck-bottomed seepage lake resides in a glacial kettle and is bordered on three sides by boggy conifer swamp and muskeg. A small stand of mature pine forest occurs east of the lake.

Site Significance

This waterbody has dense and diverse aquatic plant life and is especially notable for its concentration of rare species. Several of the rare plant populations are very large.

Lakes of this type are fairly common and are very representative features of the ecoregion. This site is especially important because of the opportunity to protect both representative and rare features.

Management Considerations

Shallow Lake and its surrounding wetlands and uplands should be considered for strong protective designation. The state does not own all of the land around the lake and the owners of the private tract should be contacted regarding the site's biological values and to explore mutual conservation interests and options.

SHALLOW LAKE			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
LAKE--SHALLOW, SOFT, SEEPAGE		NA	1994
SUBMERGENT AQUATIC		NA	1994
PLANTS			
ALGAE-LIKE PONDWEED (POTAMOGETON CONFEROIDES)		THR	1994
HIDDEN-FRUITED BLADDERWORT (UTRICULARIA GEMINISCAPA)		SC	1994
NORTHEASTERN BLADDERWORT (UTRICULARIA RESUPINATA)		SC	1994
PURPLE BLADDERWORT (UTRICULARIA PURPUREA)		SC	1994
ROBBINS SPIKERUSH (ELEOCHARIS ROBBINSII)		SC	1994
WATER-THREAD PONDWEED (POTAMOGETON CAPILLACEUS)		SC	1994

65. STONE LAKE PINES

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Dam Lake
Town-Range-Section: T38N-R9E-secs. 17 SW1/4, 20 NW1/4.
Size: 262 acres

Site Description

The primary feature of this site is a string of small upland "islands" within a boggy peatland that support remnant stands of old-growth xeric forest dominated by red pine. A few white pine are also present. The island edges are vegetated with dense growths of small balsam fir, black spruce, and an occasional white spruce. Very old snags charred by fire attest to the origin of these stands.

The surrounding peatlands are undisturbed, composed of a thick layer of sphagnum mosses which support a typical assemblage of sedges, ericaceous shrubs, and bog birch. Black spruce and tamarack are scattered throughout the wetland, with the trees occasionally reaching a density and stature approaching that of a closed forest.

Site Significance

The pine islands and adjoining peatlands are within a designated State Natural Area, selected to protect one of the very few locations in Wisconsin containing stands of old-growth pine forest. Though small patches of forest have certain conservation limitations, the scale represented by those occurring here is part of the natural range this community type exhibits naturally. This was true historically as well as at present.

Management Considerations

The major conservation limitation of the site is the very small stand size of the upland pine forest. In aggregate, the 4 or 5 pine islands total less than 15 acres. The feasibility of increasing the size of the older forest needs examination. There are stands of managed white and red pine-dominated forest in the area, (e.g., to the north on the "mainland"). The SNA perimeter does not follow any ecological boundaries and should be reviewed for adequacy. A burn plan for the site should be considered, although the pine stands are not presently in danger of succeeding to something else.

STONE LAKE PINES			
Common Name (Scientific Name)	Federal Status	State Status	Observation Date
COMMUNITIES			
NORTHERN DRY-MESIC FOREST		NA	1993
OPEN BOG		NA	1993

BOULDER FLATS PLANTATIONS (not represented on the site map)

Ecoregion: Northern Highlands Pitted Outwash
USGS 7.5' Quadrangle: Boulder Junction
Town-Range-Section: T42N-R7E-secs. 17-21, 28, 29
Size: Indeterminate due to recent salvage.

Site Description

The sandy, nearly level glacial outwash deposits south and west of the village of Boulder Junction are forested primarily with plantations of red and jack pines. While not of "natural" origin, this concentration of extensive conifer cover is important to many wildlife species dependent in some way upon coniferous ecosystems. Evening grosbeaks, pine siskins, red crossbills, solitary vireos, and gray jays were all found inhabiting this site during their respective nesting seasons. Most often these species were observed in "dirty" stands (those with scattered oak or red maple, thickets of shrubs or small fir, snags) that had some structural diversity, and more often in jack pine than in red pine.

Some of the older plantations are developing diverse structures, and are maintaining or have developed a groundlayer component very similar to what would be expected in natural stands (however, in general, this is an uncommon situation in plantations and plantation landscapes).

Site Significance

The extent of conifer cover is the site's primary feature of significance, which is prominent here but has diminished greatly in many other parts of northern Wisconsin. Recent management actions at this site (see section below) have altered stand structure but may have many positive benefits in the future as high conifer cover is maintained and the site's natural qualities increase.

Management Considerations

This site is a plantation-dominated landscape that is not included as a primary site because it is actively managed for timber production. However, it is a large site and provides important ecological values including extensive conifer cover and habitat for conifer-dependent forest-interior animals. Restoration of this site would create a large patch of natural conifer-dominated landscape with many ecological benefits.

Considerable harvest of older jack pine plantations has occurred in recent years, due both to an infestation of jack pine budworm which killed or damaged some trees, and an increasing threat of fire as trees died and the fuel load built up. In the areas recently harvested, scattered conifer stands of natural origin were retained, as were some hardwoods (mostly oaks, red maple, and cherries). The future forests should more closely resemble "natural" stands, and will still be conifer dominated.

Monitoring of the groundlayer vegetation through several rotations of plantations is worth consideration. Ideally, such a project would include both managed and unmanaged pine stands of natural origin to better understand the factors responsible for retaining the "desirable" native plant species (e.g., trailing arbutus, pipsissewa, moccasin flower, shinleaf, cow-wheat, blueberries, wintergreen, et al).

Local residents and business people are aware of the wildfire danger created by the heavy build-up of fuel at this site. Because of this, the Boulder Flats may be an unlikely choice for the implementation of a prescribed fire management plan at this time. This option should not be dismissed out of hand, however, and should receive further consideration elsewhere on the state forest.

ECOLOGICALLY SIGNIFICANT SITES OUTSIDE OF THE NHAL BOUNDARY

The following list of sites briefly describes significant natural features outside of the existing NHAL boundary. The sites are identified on Figure 8 in the main body of the report. While many of the sites are on public lands, some are privately owned and require permission to visit. We urge that private landowner's rights be respected at all times. We have omitted mention of several sites because of the lack of recent survey data or landowner sensitivity.

1. **Van Vliet Hemlocks** (Vilas Co.) – Good quality older growth hemlock-hardwoods forest and undisturbed kettle bogs are the primary features of this site.
2. **Crab Lake Hemlocks** (Vilas Co.) – Small stands of old-growth hemlock-hardwoods, wetlands, and shoreline that include rare species.
3. **Dunn Lake Pines** (Vilas Co.) – This State Natural Area straddles an undeveloped and remote stretch of the East Branch of the Presque Isle River, which flows through a stand of old-growth hemlock-hardwoods sporting a supercanopy of huge white pine.
4. **Border Lakes Landscape *** (Vilas Co.) – The area between the northern boundary of the NHAL, the Michigan-Wisconsin line, and the Ottawa National Forest features extensive stands of hemlock-hardwoods and many lakes.
5. **Palmer Lake State Trust Lands** (Vilas Co.) – This site contains managed old-growth hemlock-hardwood forest, undisturbed wetlands, and extensive frontage on Palmer Lake and the Ontonagon River.
6. **Deerpath Lake Peatlands** (Vilas Co.) – An extensive undisturbed peatland of open bog and poor fen occurs on this State Trust Land northeast of the State Forest. Small patches of old-growth hemlock forest occur on low ridges around and within the wetland.
7. **Sylvania Recreation Area** (State of Michigan) – Extensive tract of old-growth hemlock-hardwood forest in Upper Michigan's Ottawa National Forest.
8. **One Stone Lake Hemlocks** (Oneida Co.) – Fine stand of old-growth hemlock forest.
9. **Rice Lake and Thunder Lake Marsh** (Oneida Co.) – This shallow softwater drainage lake features good stands of emergent marsh and is bordered by extensive peatlands.
10. **Munninghoff Marsh *** (Oneida Co.) – This stretch of the Wisconsin River contains an extensive marsh of very good quality and supports a diverse macroinvertebrate fauna and several rare birds.
11. **Long Lake Hemlocks** (Oneida Co.) – Located just south of the NHAL border, this site supports a fine stand of old-growth mesic forest dominated by eastern hemlock.
12. **Gobler Lake** (Oneida Co.) – An undeveloped seepage lake just south of the Willow flowage is within an extensive, undeveloped, high quality acid peatland complex.
13. **Willow Flowage Recreation Area** (Oneida Co.) – The Willow Flowage is a large impoundment on the Tomahawk and Willow Rivers several miles south of the NHAL boundary. The adjacent uplands have been
14. **Tomahawk River Pines** (Oneida Co.) – This State Natural Area was purchased by the WDNR from the State Board of Commissioners of Public Lands (the "State Trust Lands" program, formerly within the Wisconsin Department of Justice). Natural features include several small but undisturbed stands

of old-growth red and white pine forest, and extensive wetlands of sedge meadow, shrub swamp, conifer swamp, and emergent marsh along the Tomahawk River.

15. **Kemp's Point Hemlocks** (Oneida Co.) – Also owned the University of Wisconsin, the grounds of the Kemp Station Research facility include a small stand of old-growth hemlock forest on the shore of Tomahawk Lake.
16. **Finnerud Pine Forest** (Oneida Co.) - Owned by the University of Wisconsin, this tract is a designated State Natural Area and contains a fine stand of old-growth to mature dry-mesic forest of red and white pines, red oak, red maple, and paper birch.
17. **Squirrel River Pines** (Oneida Co.) – This State Natural on the Squirrel River was selected primarily for its stand of mature red pine forest and wetlands bordering an undeveloped stretch of the Squirrel River.
18. **Patterson Hemlocks** (Oneida Co.) – This tract was purchased by the WDNR from the Patterson family to secure long-term protection for a stand of old-growth hemlock-yellow birch-sugar maple forest. This is one of very few old-growth mesic forest remnants in Wisconsin that includes a white pine supercanopy.
19. **Powell Marsh** – This large acid peatland complex (it's a marsh in name only) adjoins the State Forest. It is managed by the WDNR for wildlife, especially waterfowl.
20. **Bass Lake Preserve** (Iron Co.) – This privately owned conservation area protects an undeveloped lake, several small stands of older hemlock forest, and substantial wetland acreage.
21. **Goose and Reimer Lakes** (Iron Co.) – This extensive undeveloped peatland demonstrates some patterning, contains several seepage lakes, and support many rare species.
22. **Turtle Flambeau Flowage** (Iron Co.) – This recent WDNR acquisition adjoins the western edge of the State Forest. It features a large impoundment on the Flambeau River and is used primarily for recreation. Eagles, ospreys, and loons are among the many kinds of wildlife resident here.
23. **Chequamegon National Forest - Park Falls District** (Vilas - Price Cos.) – The northeastern corner of the Park Falls District of the Chequamegon National Forest contains a high concentration of mature to old-growth forest remnants, most of them conifer dominated or co-dominated, with high linkage potential to state lands.
24. **Hewitt Lake Track** (Iron Co.) – Hewitt is the largest in a complex of lakes northwest of the NHAL.